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THE PHILIPPINE
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THE RATE OF GROWTH OF PODOCARPUS IMBRICATUS AT THE TOP OF MOUNT BANAHAO, LUZON, PHILIPPINE ISLANDS

By WILLIAM H. BROWN

(From the College of Liberal Arts, University of the Philippines and Bureau of Science, Manila)

ONE PLATE AND TWO TEXT FIGURES

Conifers are, as is well known, frequently prominent or even dominant at higher elevations on tropical mountains. *Podocarpus* is one of the more prominent genera, and is widely distributed in both hemispheres; but, according to Foxworthy,[1] it seems to reach its greatest development in the Malayan region. *Podocarpus imbricatus* Blume[2] is one of the most widely distributed coniferous species in this area. Foxworthy gives the following distribution: Java, Sumatra, Celebes, Moluccas, Borneo, Malay Peninsula, Burma, Philippines, and New Guinea. Concerning its distribution in the Philippines he says:

> This is the commonest and most widely distributed species of the family in the Philippines. It covers the tops of many of our mountains. Found at elevations from 900 to 2700 meters.

Owing to its wide distribution and its prominence in many places, *Podocarpus imbricatus* Blume may be considered as a representative conifer of tropical mountains. It may, therefore, be of interest to examine its rate of growth and the condition under which it occurs on Mount Banahao which is a typical locality.

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[1] Foxworthy, F. W., Philippine Gymnosperms, *Philip. Journ. Sci.* 6 (1911) *Bot.* 149–177.

[2] The form here called *Podocarpus imbricatus* Blume is exactly that characterized by Parlatore as *P. cumingii.* Cuming's specimens were from Mount Banahao. Pilger has reduced Parlatore's species as *Podocarpus imbricatus* Blume var. *cumingii* (Parl.) Pilg., while Foxworthy treats *P. cumingii* Parl. as an exact synonym of *P. imbricatus* Blume.

Mount Banahao, on the Island of Luzon, is one of three extinct volcanic cones which form an isolated mountain mass on the boundary between the Provinces of Laguna and Tayabas. Mount Banahao is the largest of the three and has an elevation of about 2,300 meters. The next highest is Mount San Cristobal which lies to the east of Mount Banahao and is connected with the latter by a narrow saddle. The third one, Lukban Peak, is a small cone on the northeastern side of Mount Banahao. All three peaks are regular cones. Mount Banahao has a large crater which is open toward the south. The sides of the crater are very steep, while the rim is narrow and knifelike.

The area in which the rate of growth of *Podocarpus imbricatus* was studied is near the crater rim on the north side of Mount Banahao near the place where the trail from Majayjay reaches the summit. The elevation at this point is about 2,100 meters.

The forest is fairly open and consists of two stories of trees. The first or dominant story is composed almost entirely of *Podocarpus imbricatus.* Besides this species there are a few specimens of *Podocarpus costalis* Presl. The tallest individuals of *Podocarpus imbricatus* reach heights of about 14 meters while the average height of the main canopy is about 12 meters. A large part of the trees have a tendency to lean in a direction away from the slope of the mountain (Plate XVII, figs. 1 and 2). The second story is composed of a few species of dicotyledonous trees the most prominent of which is *Symplocos whitfordii* Brand. Among the other prominent species are *Drimys piperita* Hook. f., *Homalanthus alpinus* Elm., *Clethra lancifolia* Turcz., *Rhododendron kochii* Stein, *Symplocos luzonensis* Rolfe, and *Ilex serrata* Thunb. The undergrowth is scanty and the ground is largely bare. The most important element in the undergrowth is a semiwoody herb, *Strobilanthes pluriformis* C. B. Clarke. In places a small creeping plant, *Nertera depressa* Banks, forms conspicuous patches. Mosses, filmy ferns, and a few liverworts are scattered here and there. Epiphytes are much less conspicuous than on most mountain tops in the Philippines. There are a few mosses on the trees, but they are not prominent. Phanerogamic epiphytes are even less conspicuous than mosses. The most abundant species is a small orchid, *Dendrochilum venustulum* Pfitz.; this plant occurs in considerable numbers in the tops of the trees, and its small yellow flowers are rather showy during the blooming season. *Rhododendron* *quadrasianum* Vid., a larger epiphyte, occurs in much smaller numbers.

On the ground there are large numbers of small seedlings of *Podocarpus imbricatus*, but most of the other individuals of this species are more than 10 centimeters in diameter, while trees of *Podocarpus* less than 5 centimeters in diameter are very rare. This would indicate that seedlings of *Podocarpus imbricatus* do not readily survive under a mature stand.

The rainfall on the northern and northeastern slopes of Mount Banahao is distributed throughout all the months of the year, and there are no distinct wet and dry seasons.

The northeast monsoon strikes the Islands on the eastern coast. As there are no high mountain masses northeast of Mount Banahao, this monsoon brings heavy rains to the northern and northeastern slopes of the mountain. The moisture carried by the northeast monsoon is largely deposited on the eastern half of the Islands; and the monsoon continues over the western half of the Archipelago as a drying wind, which results in a marked dry season in the latter region. The southwest monsoon is not nearly so strong as the northeast monsoon, and although it brings rains on the western side of the Archipelago, much of the rain which comes at this season of the year is the result of the cyclonic disturbances (typhoons), which cause the deposition of rains on both sides of the Islands. Therefore, also during this season, heavy rains occur on the northern slopes of Mount Banahao.

Owing to the difficulty of making trips to the top of Mount Banahao to obtain regular records of climatic condition, the writer was compelled to have most of this work done by an assistant, Macario Ocampo, who had had no scientific training. For this reason the only instruments employed were a rain gauge, a recording thermometer, and a recording hygrometer. The results obtained from these are probably about as accurate as would be expected from the instruments as the reading of a rain gauge is very simple and the records from the hygrometer and thermometer were checked by the writer at various times. The hygrometer and thermometer were in a case with louver sides and a lattice bottom and were about 75 centimeters above the ground.

The rain gauge was placed in the top of a dominant *Podocarpus* and was read weekly. The results are given in Table I. An examination of this table shows at once that the rainfall is heavy and is distributed throughout the entire year. The rainfall at the top of Mount Banahao is much heavier than in the surrounding lowlands, but the distribution is very similar to that for other places on the eastern coast of Luzon. The heavy rainfall results in a constantly high moisture content of the soil.

TABLE I.—*Rainfall in centimeters at the top of Mount Banahao, Luzon, P. I. Altitude, about 2,100 meters.*

Week ending—	Rainfall.	Week ending—	Rainfall.
1915.	*cm.*	1916—Continued.	*cm.*
Nov. 10	8.50	May 17	27.00
17	27.10	24	17.10
24	28.50	31	5.01
Dec. 1	22.10	June 7	14.80
8	16.30	14	13.00
15	14.00	21	6.01
22	9.40	28	9.60
29	30.10	July 5	9.80
1916.		12	26.40
Jan. 5	18.30	19	8.00
12	9.20	26	7.01
19	14.50	Aug. 2	3.45
26	47.60	9	2.20
Feb. 2	59.80	16	4.81
9	0.23	23	4.07
16	10.50	30	3.95
23	15.20	Sept. 6	4.20
Mar. 1	6.50	13	5.11
8	9.50	20	18.40
15	3.15	27	17.80
22	2.65	Oct. 4	21.50
29	15.70	11	7.80
Apr. 5	0.52	18	20.50
12	13.60	25	18.10
19	10.50	Nov. 3[a]	41.20
26	19.80	Total	746.82
May 3	10.10		
10	7.15		

[a] Nine days.

The relative humidity records are presented in Table II in the form of maxima, minima, means, averages of daily maxima, and averages of daily minima of periods of four weeks from November, 1915, to November, 1916. The means for both humidity and temperature were taken from the original records by means of a planimeter. An examination of Table II would indicate that the humidity at the top of Mount Banahao should be favorable for plant growth.

TABLE II.—*Relative humidity for periods of four weeks in forest at the top of Mount Banahao, Luzon, P. I. Altitude, about 2,100 meters.*

Four weeks ending—	Maximum.	Minimum.	Mean.	Average daily—	
				Maximum.	Minimum.
Dec. 1, 1915	93.0	81.5	89.8	91.1	88.4
Dec. 29, 1915	97.5	85.0	90.1	91.7	88.3
Jan. 26, 1916	94.0	71.0	90.4	91.7	87.2
Feb. 23, 1916	99.0	72.0	91.2	93.6	87.8
Mar. 22, 1916	100.0	51.0	93.0	96.9	86.3
Apr. 19, 1916	100.0	62.0	94.9	97.9	91.0
May 17, 1916	97.0	85.5	92.3	94.9	89.6
June 14, 1916	97.0	87.0	93.1	96.0	91.0
July 12, 1916	99.5	86.0	93.6	96.0	91.7
Aug. 9, 1916	100.0	71.0	91.9	94.7	88.0
Sept. 6, 1916	99.0	79.0	92.5	93.9	89.0
Oct. 4, 1916	100.0	88.5	95.4	96.8	93.8
Nov. 1, 1916	100.0	91.5	96.8	98.2	90.7
Average			92.7	94.8	89.4

In Table III the temperature record is presented in the form of maxima, minima, mean, daily maxima, and average daily minimum for periods of four weeks from October, 1915, to November, 1916. The variations in the mean temperature for the different periods of four weeks are slight, the lowest mean for such a period being 13.2° and the highest, 15.8°. The average daily variation is also slight, the difference between the average maximum and the average minimum for the year being only 2.2°. There are, however, occasions when the temperature varies considerably from the mean. The highest temperature recorded during the year was 23.6° and the lowest, 5°; so that the difference between the maximum and minimum for the year is 18.6°. This variation is small as compared with the variations in temperate regions. The temperature is constantly too low to be favorable for rapid growth at any time.

TABLE III.—*Temperature for periods of four weeks in forest at the top of Mount Banahao, Luzon, P. I. Altitude, about 2,100 meters.*

Four weeks ending—	Maximum.	Minimum.	Mean.	Average daily—	
				Maximum.	Minimum.
Dec. 1, 1915	17.7	10.6	14.9	15.9	13.3
Dec. 29, 1915	17.1	10.0	13.8	14.7	13.1
Jan. 26, 1916	16.5	8.3	13.4	14.6	12.0
Feb. 23, 1916	15.8	7.7	13.2	14.2	12.0
Mar. 22, 1916	17.8	5.0	13.5	15.0	12.2
Apr. 19, 1916	17.1	10.3	13.5	14.5	12.4
May 17, 1916	19.2	11.1	15.0	16.2	13.8
June 14, 1916	18.9	14.3	16.1	17.6	15.2
July 12, 1916	22.7	12.5	15.7	17.4	14.8
Aug. 9, 1916	23.6	9.2	15.2	16.7	14.1
Sept. 6, 1916	19.2	12.2	14.9	16.1	14.6
Oct. 4, 1916	17.1	12.2	15.8	15.6	14.2
Nov. 1, 1916	17.1	14.5	15.6	15.9	14.7
Average			14.6	15.7	13.6

Since no annual growth rings have been observed in the wood of *Podocarpus imbricatus*, the rate of diameter growth can only be determined by making periodical measurements of the girth of the same trunks. On May 29, 1914, the girths of a number of trees of *Podocarpus imbricatus* were measured with a steel tape at breast height, or 1.5 meters above the ground; and that the trees might be again measured at exactly the same point the place of measurement was, in each case, indicated by a small nail. A year later the trees were again measured and the differences between the two measurements taken to be the rates of growth in girth for the year in question. As the climatic condition in Luzon for this year was approximately average, it is probable that the rates of growth obtained for *Podocarpus* are approximately average rates of growth for this species in this locality. The growth figures have been converted into the more usual form of rates of diameter growth. The results are presented in Table IV, in which the trees are classified according to diameter classes of 10 centimeters. In order to approximate the total ages of trees of different sizes, the average annual rate of growth of each 10-centimeter class was divided into 10 centimeters and the quotients assumed to be the number of years necessary for an average tree to pass through the 10-centimeter diameter classes. By summing up these quotients we can obtain a figure which represents the age of an average tree in any 10-centimeter diameter class; that is, the quotient obtained by dividing the annual growth of the size class from 0 to 10 centimeters into 10 centimeters may be assumed to be the age of a 10-centimeter tree. Adding this quotient to that obtained in a similar manner for the 10- to 20-centimeter class, gives the age of a 20-centimeter tree. In order to obtain figures for the age of trees of any size and to represent the above data in graphic form, a curve of diameter growth on age was constructed by plotting the data on cross-section papers, the ordinates of the curve being diameters and the abscissae, years.

TABLE IV.—*Annual diameter growth of Podocarpus imbricatus at top of Mount Banahao, Luzon, P. I. Altitude, about 2,100 meters.*

[Diameter in growth are given in centimeters.]

No. of tree in class.	Diameter class in centimeters.					
	0-10.		10-20.		20-30.	
	Diameter.	Growth.	Diameter.	Growth.	Diameter	Growth.
1	7.6	0.06	12.8	0.32	20.7	0.13
2	8.5	0.06	13.4	0.13	21.0	0.09
3			14.1	0.17	21.1	0.09
4			15.4	0.06	21.2	0.22
5			15.9	0.09	21.3	0.03
6			16.0	0.19	21.5	0.35
7			17.2	0.06	21.8	0.06
8			17.8	0.14	22.0	0.22
9			18.1	0.06	22.2	0.03
10			18.3	0.16	22.4	0.06
11			18.7	0.13	22.7	0.19
12			19.0	0.09	23.0	0.35
13			19.4	0.32	23.2	0.14
14			19.6	0.08	23.4	0.19
15					23.5	0.03
16					24.0	0.03
17					24.2	0.19
18					25.0	0.19
19					25.3	0.14
20					25.6	0.13
21					26.4	0.22
22					26.5	0.11
23					26.6	0.09
24					26.7	0.16
25					26.9	0.09
26					27.5	0.35
27					27.8	0.06
28					29.3	0.13
29					29.4	0.09
30					29.5	0.29
Average		0.07		0.14		0.15
Years in class		167		71		67

TABLE IV.—*Annual diameter growth of Podocarpus imbricatus at top of Mount Banahao, Luzon, P. I.—Altitude, about 2,100 meters*—Continued.

No. of tree in class.	Diameter class in centimeters.					
	30-40.		40-50.		50-60.	
	Diameter.	Growth.	Diameter.	Growth.	Diameter.	Growth.
1	30.5	0.09	41.0	0.13	50.9	0.32
2	30.6	0.06			51.9	0.13
3	32.0	0.22			53.1	0.16
4	32.1	0.09			56.1	0.25
5	33.0	0.16				
6	33.2	0.35				
7	33.4	0.19				
8	33.8	0.22				
9	34.8	0.03				
10	36.0	0.16				
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
Average		0.16		0.13		0.21
Years in class		62		77		53

This curve is shown in fig. 1. The curve indicates that the trees undergo a suppression period before they reach diameters of 10 centimeters. According to this curve a tree 60 centimeters in diameter has an age of 497 years.

The method used in estimating the age of *Podocarpus* is open to the following objections. All of the trees in the 0- to 10-centimeter diameter class were more than 5 centimeters in diameter, and it is to be expected that they would show a faster rate of growth than smaller and more suppressed individuals. On the other hand some of the trees in the 0- to 10-centimeter diameter classes may be shaded to such an extent that they will die before reaching larger sized diameter classes. Such trees, would be expected to grow slower than trees, which are now larger, did when they were 5 to 10 centimeters in diameter. It will be seen, therefore, that the age of a 10-centimeter tree cannot be calculated with any considerable degree of accuracy from the present figures. Most of the trees with diameters greater than 10 centimeters are in the main canopy so that any error, due to the fact that some of these may not reach larger sized classes, is probably very small.

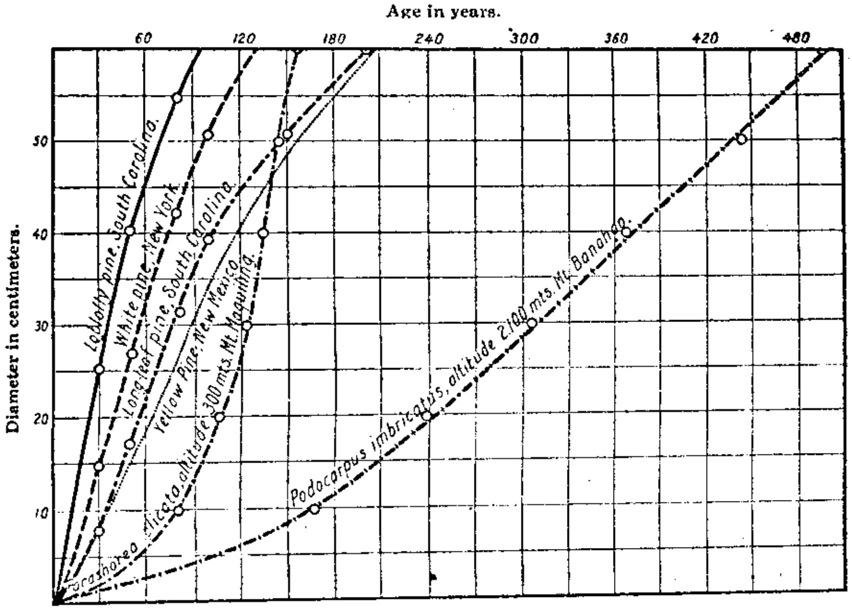

FIG. 1. Rates of growth of *Podocarpus imbricatus* on Mount Banahao and of pines in the United States.

In fig. 1 are also shown curves for loblolly pine[3] in South Carolina, white pine[3] in New York, long-leaf pine[3] in South Carolina, and yellow pine[4] at an altitude of 2,650 meters in New Mexico. It will be seen at a glance that the growth of all of these species is very much more rapid than that of *Podocarpus imbricatus* and that the difference between the rates of growth of the fastest and the slowest growing of these temperate zone species is very much less than the difference between the rate of growth of yellow pine, which shows the slowest growth, and that of *Podocarpus imbricatus*. *Podocarpus imbricatus* when 50 centimeters in diameter appears to be 2.4 times as old as yellow pine with the same diameter and 5.3 times as old as loblolly pine. These figures would indicate that *Podocarpus imbricatus* on Mount Banahao is growing under much less favorable conditions than these different species of pine in the United States.

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[3] Graves, H. S., and Ziegler, E. A., The woodman's hand book, *Bull. U. S. Forestry Service* 36 (1910) 189–190.

[4] From data collected by Mr. O. F. Bishop in the Carson National Forest in 1911.

The moisture conditions on Mount Banahao would appear to be favorable throughout the year, as the humidity is constantly high and the soil is moist.

Unfortunately we have no exact method of comparing the effects of various climatic factors in different regions. A means of estimating the effect of temperature on growth in different localities has been suggested by Livingston and Livingston.[5] They assume that the rate of growth is unity at 40° F. and that it doubles for every rise of 10° C. In other words that the effect of temperature on growth follows the well-known van't Hoff principle. If t is taken as the normal daily mean temperature on the Fahrenheit scale and if u is the corresponding temperature efficiency for growth, then according to the assumption

$$u=2^{\frac{t-40}{18}}.$$

The indices obtained in this manner are called exponential indices. The time element is taken into account by adding together the efficiency indices for all of the days of the frostless season. The results are summation indices. Following this method, Livingston and Livingston have prepared a chart of the temperature efficiencies for the United States. Livingston[6] has devised another series of indices, based on Lehenbauer's work on the relation of temperature to the rate of growth of maize seedlings.

In Table V are given the summation indices for the period of an average frostless season, according to both systems, for New York and South Carolina; also summation indices for a whole year for the top of Mount Banahao. The figures for New York

TABLE V.—*Summation indices of temperature efficiency for plant growth, according to the physiological and exponential systems, for New York, South Carolina, and the top of Mount Banahao.*

	New York.	South Carolina.	Mount Banahao.
Physiological	5,968	16,007	6,016
Exponential	447	884	736

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[5] Livingston, B. E., and Livingston, G. L., Temperature coefficients in plant geography and climatology, *Bot. Gaz.* 56 (1913) 349–375.

[6] Livingston, B. E., Physiological temperature indices for the study of plant growth in relation to climatic conditions, *Physiological Researches* 1 (1916) 399–420.

and South Carolina are averages of the figures given by Livingston for stations in these states.

The figures in Table V would not indicate that the temperature at the top of Mount Banahao is more unfavorable for growth than that in the northern United States. Such a conclusion must, however, be regarded as tentative.

Owing to the prevalence of clouds the light conditions at the top of Mount Banahao are very unfavorable. It is usual for mountains on tropical islands to be frequently capped with clouds and the decrease in the intensity of light, due to this, is probably responsible, in a considerable measure, for the rapid dwarfing of vegetation as high altitudes are reached on such mountains. According to Wiesner[7] sunless days are much more frequent at the tops of mountains than at lower altitudes. At the top of Mount Banahao the sun is obscured for a large part of most days, and this is probably a very important factor in causing a slow rate of growth.

In fig. 1 is also shown a curve of growth of *Parashorea plicata*[8] at an altitude of 300 meters on Mount Maquiling. This curve shows that the small individuals of *Parashorea* undergo a suppression period, but that after this period is passed *Parashorea* grows much more rapidly than any of the four species of pines whose growth curves are given in the same figure, and very much more rapidly than *Podocarpus imbricatus*.

In Table VI the rate of growth of *Podocarpus imbricatus* is compared with the rates of growth of some species of dipterocarps growing at low altitudes in the Philippines.[9] This relation

TABLE VI.—*Rates of growth of Podocarpus imbricatus on Mount Banahao as compared with rates of other species in the Philippines.*

[Figures represent annual diameter growth in centimeters.]

Species.	Location.	Altitude.	Diameter class in centimeters.					
			5-10.	10-20.	20-30.	30-40.	40-50.	50-60.
		Meters.						
Parashorea plicata	Mount Maquiling	300	0.28	0.40	0.62	0.92	0.83	0.88
Shorea teysmanniana	Northern Laguna	500	0.27	0.38	0.57	0.50	0.54	0.43
Shorea polysperma	do	500	0.27	0.27	0.40	0.37	0.55	0.34
Shorea squamata	do	500	0.32	0.28	0.35	0.28	0.42	0.26
Shorea polysperma	Mount Mariveles	400-500	0.13	0.26	0.36	0.52	0.41	------
Dipterocarpus grandiflorus.	do	400-500	0.07	0.16	0.19	0.16	0.16	0.22
Podocarpus imbricatus	Mount Banahao	2,100	0.06	0.14	0.15	0.16	0.13	0.21

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[7] Wiesner, J. Der Lichtgenuss der Pflanzen (1907).

[8] Brown, W. H., and Matthews, D. M., Philippine dipterocarp Forests, *Philip. Journ. Sci.* A, 9 (1914) 413–561.

[9] Brown, W. H. and Matthews, D. M., loc. cit.

is shown graphically in fig. 2. The dipterocarps, like *Podocarpus imbricatus,* are dominant trees. It will be seen at once that five of the different species of dipterocarps show rates of growth which are very much more rapid than that of *Podocarpus imbricatus.* The sixth, *Dipterocarpus grandiflorus,* also shows a faster rate of growth than *Podocarpus imbricatus.* Fig. 2 would seem to indicate that the rate of growth of the average dipterocarp is about 2.5 times as rapid as that of *Podocarpus imbricatus* at the top of Mount Banahao, which is not surprising in view of the fact that *Podocarpus* is subjected to conditions of temperature and light that are very unfavorable as compared with those under which the dipterocarp species are found.

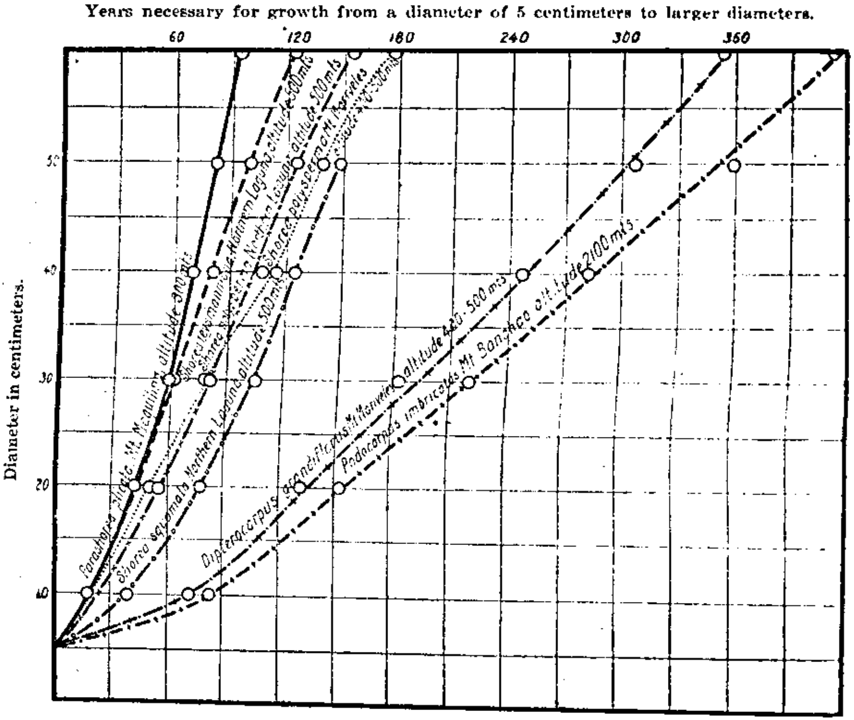

FIG. 2. Rates of growth of *Podocarpus imbricatus* on Mount Banahao and of dipterocarp species in other parts of the Philippines.

CONCLUSIONS

Podocarpus imbricatus at the top of Mount Banahao shows a very slow rate of growth, a tree 60 centimeters in diameter being about 500 years old. The rate of growth of *Podocarpus* is very much slower than that of dominant trees at lower elevations in the Philippines and of pines in the United States.

ILLUSTRATIONS

PLATE XVII

FIG. 1. A view in the forest near the top of Mount Banahao. The prominent trees are *Podocarpus imbricatus*. Note the slant of the trees. Some epiphytes are seen on the trunks but they are much less prominent than is usual on mountain tops in the Philippines.

2. Another view in the forest near the top of Mount Banahao. The large trees are *Podocarpus imbricatus*. The undergrowth appears denser than it really is, due to the fact that the picture was taken on a foggy day and that the perspective is poor.

TEXT FIGURES

FIG. 1. The rates of growth of *Podocarpus imbricatus* on Mount Banahao and of pines in the United States.

2. The rates of growth of *Podocarpus imbricatus* on Mount Banahao and of dipterocarp species in other localities in the Philippine Islands.

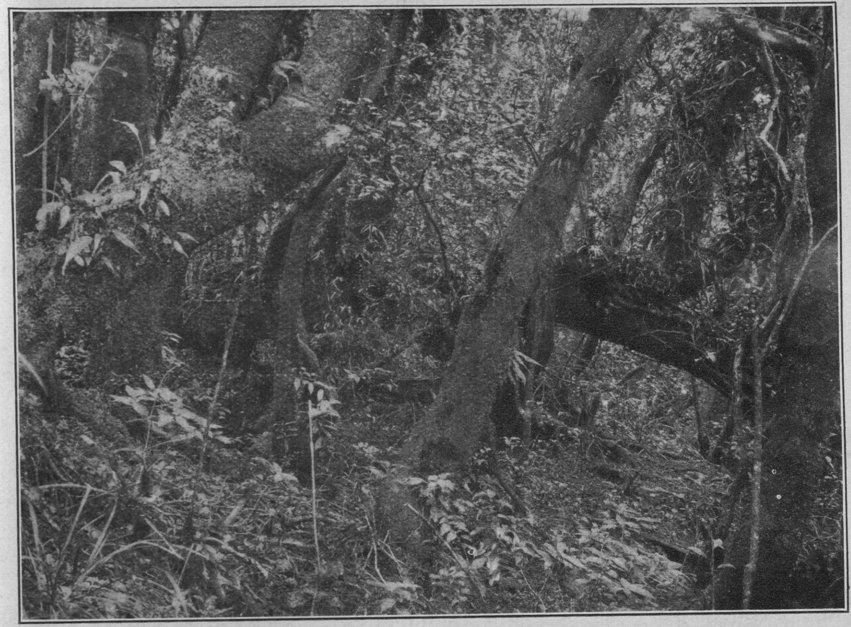

Fig. 1. Forest of Podocarpus imbricatus.

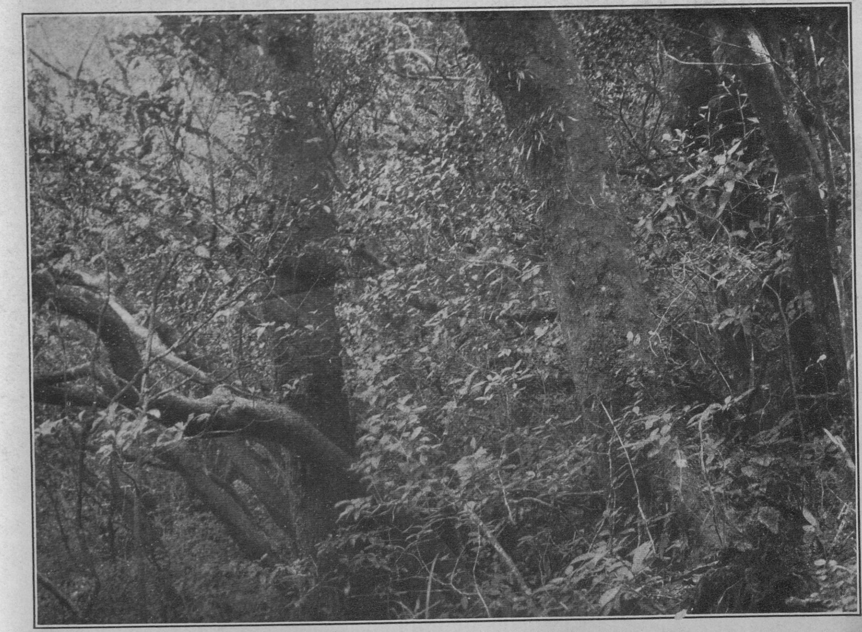

Fig. 2. Forest of Podocarpus imbricatus.

PLATE XVII.

THE PHILIPPINE JOURNAL OF SCIENCE, C. BOTANY.
Vol. XII, No. 6, November, 1917.

THE GENUS CHRISTIOPTERIS

By EDWIN BINGHAM COPELAND

This genus was described by me in 1915.[1] The original description is in error in the spelling of the generic name, which was written *Christiopteris*, and in the statement that there are no paraphyses. In reality, there are present few and small paraphyses, sometimes branched near the head. The type species, *Christiopteris Sagitta* Copel., was originally described by Christ from sterile material, as a *Polypodium* of the section *Phymatodes*. Superficially, this sterile frond certainly suggests relationship to *Phymatodes* so strongly that its reference to that group is easily understood. On the basis of its fruiting characters, I first ascribed to the fern a position in the subtribe *Taenitideae*, next to *Drymoglossum*.

A little later, I was fortunate enough to find fruiting material in the neighborhood from which Christ's sterile specimens had come, and published a photograph of this.[2] At about the same time, sterile material from Rizal Province, Luzon, was sent to Christ, who was disposed to regard it as a distinct species; similar fronds from Mount Apo, Mindanao, have the same form. It has never been found fertile in Mindanao, although I have since found it sterile on Mount Matutum also. Mindanao specimens are characterized by short, relatively rounded lobes of the sterile frond; but as the sterile fronds of Luzon plants which are not yet adult pass through such a stage, it is safer for the present to regard all Philippine specimens as belonging to the one species.

The genus is characterized by dimorphous fronds, the fertile strongly contracted, the fructification acrostichoid but not reaching to midrib or margin. The sporangium-bearing region, which may properly be called a hymenium, is rather more vigorous over the veinlets, but extends without a break over the parenchyma. The veinlets of the sterile frond anastomose freely, in the manner very familiar in *Phymatodes*, *Drynaria*, etc., with the characteristic branched included free veinlets. The annulus is of about 14 cells, and the spores are reniform or bilateral, never tetrahedral.

The next publication on this genus was by Christ.[3] Christ here recognizes four species which in the order of their vegetative development, the most amply developed first, are:

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[1] Perkins, J., Frag. Fl. Philip. (1905) 188.

[2] Philip. Journ. Sci. 1, (1906) Suppl. *pl. 13*.

[3] Journn. de Bot. II 1 (1908) 24.

1. **C. Eberhardtii** Christ.
2. **C. tricuspis** (Hooker) Christ.
3. **C. Sagitta** (Christ) Copel.
4. **C. cantoniensis** (Baker) Christ.

The sterile frond of *C. Eberhardtii* is large and five lobed. The fertile frond is unknown. In this paper, Christ suggests the relationship of *Christiopteris* and *Cheiropleuria.*

Bower[4] has recently made a very careful anatomical study of the fern hitherto best known as *Leptochilus tricuspis* (Hooker) C. Chr. but which he calls "*Gymnopteris* (*Leptochilus*) *tricuspis* (Hook.), C. Chr.," a name which may surprise Christensen. From his summary, I quote:

> 3. L. tricuspis stands alone in the latter genus (Leptochilus) in various features, but especially in the diplodesmic character. It should, therefore, be removed, and by reviving its old generic name, now merged in Leptochilus, it may be styled Gymnopteris tricuspis (Hook.), Bedd. Of that genus it will be at present the only species.

The name which Bower attempts to revive could not possibly stand as valid; but there is still no necessity for a new name, as that already cited, given by Christ and listed in the Supplement to Christensen's Index, is certainly correct.

As noted by Bower, Mrs. Schumann[5] has grouped together *Leptochilus tricuspis* and *L. varians* (Mett.) Fournier, a fern known only in New Caledonia, noting that both have bilateral spores. The herbarium of the Bureau of Science has a number of specimens of the latter species, which struck me several years ago as by no possibility belonging in *Leptochilus,* and as probable relatives of *Christiopteris.* Bower's paper has stimulated me to investigate this more carefully. There is a special bundle system underlying the sporangia, but this is not at all sharply distinguished, in the fronds studied, from the general bundle system nearer the upper surface of the frond, which is homologous to the bundle system of the sterile frond. There are many small paraphyses which are always or nearly always simple. The paleae of the rhizome are ovate, with many or several border cells with thin walls, without trichome-like outgrowths, and not at all reddish in color.

A similar examination of *Christiopteris Sagitta* has shown that, as already stated, there are small paraphyses, simple or branched. A special bundle system is present under the hymenium, apparently less developed and distinct than in *C. tricuspis,* but more distinct than in *Leptochilus varians.* The paleae are peltate at the base but drawn out until they have the appearance of harsh hairs, reddish-brown in color, with only the marginal walls of the marginal cells distinctly thin, and with many short marginal hairs, which are not cut off by a wall. The agreement in these anatomical details with those of *C. tricuspis,* as described by Bower, is so perfect that Christ's judgment in uniting the species under one genus is completely vindicated.

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[4] Studies in the Phylogeny of the Filicales, VI. Ferns showing the 'Acrostochoid' condition, with special reference to dipteroid derivatives, *Ann. Bot.* 21 (1917) 1–39.

[5] Die Acrosticheen und ihre Stellung im System der Farne, *Flora* 108 (1915) 201–260.

The case of the New Caledonia plant is not quite so clear. The paleae are decidely distinct, the only real suggestion of similarity being that the cells near the margin are thinner walled than those at the base and axis of the paleae; and in this respect, they are like the paleae of a considerable number of ferns in genera probably belonging to the same phylogenetic group. Since it most certainly should not be left in *Leptochilus,* and I do not care to distinguish it as a genus characterized by the paleae alone but otherwise like *Christiopteris,* it may be known as CHRISTIOPTERIS VARIANS (*Acrostichum varians* Mett. in Ann. Sci. Nat. IV 15 (1861) 56.)

The genus *Christiopteris,* as now constituted, includes one species in the Himalayas, one in Siam, one in southern China, one in the Philippines, and one in New Caledonia, a discontinuous distribution extending over practically the whole extent of the Malay-Asiatic fern region and indicating, with a high measure of probability, a very considerable antiquity. As the ferns of the intervening regions become better known, it will almost certainly develop that the distribution is by no means as discontinuous as it now appears. In the Philippines, in the course of more than a decade of steady work by a number of good fern collectors, sterile fronds have been found once each on five different mountains, while fertile fronds are still known only from one spot on Mount Mariveles and one collection on Mount Data. A group which has eluded collectors so successfully in the Philippines may be widespread in such little-known regions as New Guinea, Celebes, Borneo, and Sumatra, and have been overlooked in the past.

Bower's previous note[6] had already suggested a likely origin of *Christiopteris, Photinopteris, Cheiropleuria,* and various groups recognized as *Polypodium* or its relatives, all as probable descendants of the ancient group, the characteristics of which are more perfectly preserved today by *Matonia* and *Dipteris*. His last paper goes into this subject more thoroughly and more conclusively. In field work, during all my years in this part of the world, I have been constantly struck by the common occurrence of dichotomy as a sort of monstrosity of the fronds of *Polypodium*, using the name now in the broad sense in which it is used, for example, in the Natürliche Pflanzenfamilien. While occasional forked fronds are found in the ferns of almost every group, they are rare in most groups, and relatively very common in this one. If I were to go over the very large collections in Manila, mounted and unmounted, I do not believe that I would find dichotomous fronds of less than 75 species which at present bear the generic name *Polypodium*. In some of these it is common enough to be characteristic, as in *P. ceratophyllum* Copel. of Borneo, and *P. Curranii* Copel. of Luzon. Now that the probability has been established, on wholy different grounds, that these ferns are descendants from a group characterized by dichotomy, the occurrence of such fronds in many different species should be regarded as valid contributary evidence.

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[6] Studies in the Phylogeny of the Filicales, V, *Ann. Bot.* 19 (1915) 475.

In search of further points of connection and possible primitive groups, I have examined a number of ferns with regard to the characters emphasized by Bower. *Polypodium incurvatum* Blume is strikingly suggestive of *Christiopteris* in form of sterile fronds and is somewhat dimorphous. Its annulus has 14 or 15 cells. The spores are bilateral and tuberculate. It has a distinct hypodermis, but this is by no means as sharply and conspicuously developed as is true of most species of the *Phymatodes* group. In *Christiopteris* it is still less developed, although the layer immediately under the upper epidermis is somewhat different from the deeper-lying cells of the mesophyll. The paleae of *Polypodium incurvatum* are stout and peltate, not much drawn out to a point, with apparently entire margin (my material is old), almost all walls thin and not colored, except near the base, where the paleae are several cells thick. The points of resemblance to *Christiopteris* are not very significant.

Polypodium Curranii Copel. is a member of the group of *P. myriocarpum* Mett., distinguished by Fée under the generic name *Microsorium*. The paleae are acuminate with the marginal cells alone thin; they are entire or with obscure-teeth formed by projections of the walls between cells.

Drymoglossum carnosum J. Sm. has reniform spores and an annulus of 14 cells. The elongate sorus is supplied by a single bundle which is nearer the nether surface of the leaf than are the other bundles of the same frond. The paleae are peltate or sagittate, caudate, with the marginal walls alone thin and with small teeth, which, however, have thick middle walls, being formed by the joint projection of two marginal cells and the wall between them.

Cyclophorus angustatus Desv., a species notable for its elongated sori, has a single bundle layer under the sorus. The spores are bilateral and the annulus is of 14 or 15 cells. The paleae are long and slender, but not caudate, entire and without very thin walls, although colorless except near the base. The hypodermis is of very large cells which are not very irregular.

Photinopteris speciosa J. Sm. has an obvious and irregular hypodermis not essentially different from that characteristic of the *Phymatodes* group. Its spores are bilateral and the annulus is of about 13 cells. The leaf is much compressed under the sorus, without room for more than one bundle in a layer. The paleae are peltate, but immediately narrowed to a long, harsh, hair-like point. The marginal wall is usually thin, with very peculiar teeth. The smaller of these are like those of *Drymoglossum* and *Hymenolepis;* but there are present also others in which the teeth elongate, one of the cells sometimes outgrowing the other; or both cells may elongate, and separate in the outer part. *Photinopteris* has enough characters in common with *Christiopteris* so that their general affinity is unmistakable; although, as Bower has already shown, Christ's suggestion that they may have eventually to be united is untenable. On the other hand, *Photinopteris* is likewise unmistakably a relative of the *Phymatodes* group; this is the only construction which I can place on the presence in both of the peculiar layer of cells under the upper epidermis.

Aglaomorpha pilosa Copel. (*Dryostachyum pilosum* J. Sm.) has reniform spores and setose sporangia with an annulus of 14 or 15 cells. The lamina under the hymenium is very thin, without room for a diplodesmic vascular supply. The paleae are peltate at the base, and lanceolate, with the walls gradually becoming thinner toward the margin. The margin itself is lacerate-ciliate by separation from the body of the scale of the upper ends of the marginal cells. The hypodermis, already figured in my paper on comparative ecology,[7] has the *Phymatodes* characteristics.

The affinity of *Photinopteris speciosa* J. Sm. and *Aglaomorpha pilosa* Copel. is unmistakable. The most peculiar characteristic of *Photinopteris* is probably the isolated gland below the base of each pinna. *Aglaomorpha pilosa* has likewise a glandular

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[7] Philip. Journ. Sci. 2 (1907) *Bot. 3, fig. 36.*

spot on the lamina, immediately below the insertion on the main rib of the rib of each segment. The glands of the two ferns are unmistakably homologous. The two are alike also in being pubescent, although the pubescence itself is not identical. Both also commonly bear lime-dots on the upper surface of young fronds. *Aglaomorpha pilosa*, however, is still more nearly related to *A. splendens* Copel. (*Dryostachyum splendens* J. Sm.); I do not doubt at all the propriety of keeping these two species in one genus and maintaining *Photinopteris* as a separate genus. *Aglaomorpha* as a whole is likewise an unmistakable member of the *Drynaria* group of genera and nearly related to individual species currently regarded as belonging in *Polypodium*. It is interesting, in this connection, to note that the fern originally described by Hooker as *Acrostichum drynarioides*, for which I have created the genus *Merinthosorus*, has been included in *Dryostachyum* (which I consider inseparable from *Aglaomorpha*) by Kuhn, and in *Photinopteris* by Beddome.

In conclusion, it may be observed that we are dealing with a considerable number of ferns, all of which can be regarded almost with certainty as descendants of a common group less remote than their common ancestor with other *Polypodiaceae*, a group to which Bower has given the name of *Dipterideae*, but which I would prefer to call *Matonieae*. Different members of this group share such characters as the tendency to dichotomy; drynarioid venation; harsh hair-like paleae; thin, marginal walls of paleae; reddish color of paleae; peculiar teeth on the paleae; round, elongate or indefinite collections of sporangia not reaching the margin; annulus of about 14 cells; bilateral spores; diplodesmic venation beneath the hymenium; and a peculiar hypodermis underlying the upper epidermis. Different groups of species and of genera have maintained different collections of these characters. Unless one character be very distinctive and restricted to few species, as in the case of the peculiar gland of *Photinopteris*, single characters can hardly be trusted to show particular affinities within this great group. It seems to me, however, that the number of characters exhibited by *Platycerium*, *Cheiropleuria*, *Christiopteris*, *Hymenolepis*, *Drymoglossum*, *Cyclophorus*, *Photinopteris*, *Aglaomorpha*, *Merinthosorus*, *Dendroconche*, and the paleotropic Polypodia with anastomosing veins, and *Dipteris*, *Matonia*, and *Phanerosorus* amply justifies regarding these as a group distinct from the other very large group of *Polypodiaceae* which are descendants of an old group now best represented by *Balantium*, *Dicksonia*, *Dennstaedtia*, *Cystodium*, and *Cyathea*.

THE PHILIPPINE JOURNAL OF SCIENCE, C. BOTANY.
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NEW PHILIPPINE MELASTOMATACEAE

By E. D. MERRILL[1]

(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila*)

At the commencement of our botanical exploration of the Philippines in 1902, but a few representatives of this characteristic family were known from the Archipelago. The number of genera is not large, representatives of but about twenty-one being now known from the Philippines; by far the largest genus is *Medinilla*, while *Astronia* and *Memecylon* are both represented by a fair number of species. With the exception of a few of the more common and widely distributed species most of the representatives of this family are confined to the forested areas, and a very high percentage of them are not only endemic, but are also very local. I have previously published two papers[2] devoted entirely to representatives of this family, chiefly to the genera *Astronia, Memecylon,* and *Medinilla.* The present paper is in the nature of a continuation of the former ones and consists chiefly of the descriptions of twenty-eight new species in the genera *Anerincleistus, Astronia, Medinilla, Melastoma, Otanthera,* and *Memecylon,* with a new variety of *Beccarianthus ickisii* Merr.; the genus *Anerincleistus* is new to the Philippines.

ANERINCLEISTUS Korth

ANERINCLEISTUS PHILIPPINENSIS sp. nov.

Frutex 2 ad 3 m altus; ramulis dense pilosis; foliis oppositis, in eisdem paribus inaequalibus sed similimis, ovatis, chartaceis, acuminatis, denticulatis, basi cordatis, 7- vel 9-nerviis usque ad 20 cm longis, utrinque plus minusve hirsutis vel hispido-pilosis; floribus axillaribus, solitariis vel fasciculatis, pedicellatis, petalis circiter 1.5 longis.

An erect, branched shrub 2 to 3 m high, most parts more or less densely pubescent. Branches terete, rather slender, densely pilose with short, spreading, brownish or purplish hairs. Leaves in pairs, unequal but similar in shape, ovate, 10 to 20 cm long, 6 to 15 cm wide, base broad, cordate, apex rather sharply acuminate, margins denticulate, the upper surface somewhat hispid-pubescent, the hairs dense on the nerves, otherwise scattered, short, the lower surface paler, more densely and softly pubescent; nerves 7 to 9 from the base, the inner 5 more prominent than the others and reaching to the apex, often reddish; transverse veinlets subparallel, prominent, distant, the reticulations lax; petioles densely pubescent, 2.5 to 9 cm long. Flowers pink-purple, axillary, solitary or fascicled, their pedicels densely pubescent, 1 to 1.5 cm long. Calyx ovoid, densely hirsute with spreading hairs, about 1 cm long, 8 mm thick, the lobes 4, oblong-lanceolate, acuminate, about 9 mm long, 4 mm wide, hirsute on both surfaces, ultimately deciduous. Petals elliptic-oblong or oblong, equilateral, glabrous, shortly and slenderly apiculate-acuminate, base somewhat narrowed, about 1.5 cm long, 11 mm wide. Stamens 8, subequal; filaments 1 cm long; anthers inflexed in bud, lanceolate, acuminate, somewhat curved, 9 to 10 mm long, opening by a terminal pore, the connective not produced, not appendaged in front, the posterior appendage at the base very short, stout, obtuse, less than 0.3 mm long. Ovary glabrous, somewhat urceolate, nearly or at least one-half free, 4-celled, apex with a somewhat produced, irregularly denticulate but scarcely lobed margin; style about 2 cm long, slender; stigma punctiform. Capsule about 6 mm long, glabrous, but surrounded at the base by the densely hirsute, persistent calyx-tube, 4-valved, concave at the apex, the valves somewhat thickened upward, their apices obliquely truncate, about 2 mm broad. Seeds numerous, oblong-obovate, 0.5 mm long, apex truncate, minutely verruculose.

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[1] Professor of botany, University of the Philippines.

[2] Merrill, E. D., Studies on Philippine Melastomataceae, I, *Philip. Journ. Sci.* 8 (1913) Bot. 207–250; II, op. cit. 335–361, *pl. 11, 12.*

PALAWAN, Malampaya Bay, in thin forests at an altitude of from 2 to 5 meters, on hillsides near the sea, *Merrill 7241* (*Phil. Pl. 408*), September 18, 1910, *Merrill 9412*, May, 1913; Mount Capoas, *Merrill 9552* April 21, 1913.

The first representative of the genus to be found in the Philippines, differing from all described ones especially in its large flowers. The type of the genus, *Anerincleistus hirsutus* Korth., and most of the known species have very small flowers, but in *A. macranthus* King, of the Malay Peninsula, the flowers are nearly as large as in the present species. The genus has about ten known species, other than the one above described, in Borneo, Sumatra, the Malay Peninsula, and Burma.

ASTRONIA Noronha

ASTRONIA CONSANGUINEA sp. nov. § *Euastronia*.

Species *A. verruculosae* affinis, differt foliis multo majoribus, usque ad 25 cm longis. Arbor parva, circiter 6 m alta, novellis ferrugineo-furfuraceis exceptis glabra; bracteis magnis, oblongis ad oblongo-ovatis, 12 ad 15 mm longis; floribus infundibuliformibus, 5-meris, calycis glabris vel obscurissime furfuraceis, circiter 4 mm longis, 6 mm diametro.

A tree about 6 m high, ultimately glabrous, the very young growing parts prominently ferrugineous-furfuraceous. Branches brown, terete, rugose, about 6 mm in diameter. Leaves subcoriaceous, green and of about the same color on both surfaces when dry, minutely and densely verruculose, dull or slightly shining, oblong-elliptic, 20 to 25 cm long, 7 to 10 cm wide, narrowed below to the very prominently 3-nerved cuneate base, the apex rather abruptly and slenderly acuminate, the acumen obtuse, about 1 cm long, glabrous on both surfaces, or the nerves on the lower surface minutely and obscurely lepidote; lateral longitudinal nerves about as prominent as the midrib, the marginal pair about as distinct as are the transverse nerves and 2 to 4 mm from the edge of the leaf; petioles stout, 5 to 6 mm long, narrowly winged, when very young somewhat furfuraceous, becoming glabrous. Panicles terminal, peduncled, many flowered, about 8 cm long, sometimes branched from the base, sparingly appressed furfuraceous-lepidote. Flowers white or pink, crowded at the apices of the branchlets, 5-merous, the subtending bracts conspicuous, oblong to oblong-ovate, 12 to 15 mm long, concave, subcoriaceous, dark-colored when dry, slightly lepidote or nearly glabrous. Staminate flowers funnel-shaped, the calyx-tube about 4 mm long, 6 mm in diameter, glabrous or very obscurely lepidote, the teeth 5, broad, blunt. Petals 5, orbicular-obovate, 5 to 6 mm in diameter.

LUZON, Tayabas Province, Infanta-Siniloan trail, *Bur. Sci. 29215 Ramos & Edaño*, June 12, 1917, in forests along small streams.

The alliance of this species is manifestly with *Astronia verruculosa* Merr., from which it is readily distinguished by its very much larger leaves and smaller, glabrous or nearly glabrous flowers.

ASTRONIA PACHYPHYLLA sp. nov. § *Euastronia.*

Frutex 2 ad 4 m altus, glaber vel subglaber, ramis ramulisque incrassatis, obscure 4-angulatis vel subteretibus; foliis crasse coriaceis, ellipticis ad obovato-ellipticis, usque ad 9 cm longis, in siccitate utrinque minutissime verruculosis, olivaceis vel brunneo-olivaceis, concoloribus, basi cuneatis, prominente 3-nerviis, apice abrupte et brevissime apiculatis; paniculis terminalibus, usque ad 8 cm longis, pedunculatis; floribus plus minusve confertis, 4-meris; bracteis oblongo-ovatis, obtusis, usque ad 9 mm longis; calycis circiter 4 mm longis et 5 mm diametro, glabris vel subglabris, dentibus late triangularibus, circiter 1.5 mm longis.

A shrub 2 to 4 m high, nearly glabrous. Branches and branchlets thickened, obscurely 4-angled or subterete, the branches 5 to 8 mm in diameter, brown, glabrous, somewhat rugose when dry, the internodes 7 to 20 mm long. Leaves thickly coriaceous, olivaceous or brownish-olivaceous when dry, of about the same color on both surfaces, minutely and densely verruculose, glabrous, elliptic to obovate-elliptic, 5 to 9 cm long, 2.5 to 4.5 cm wide, base cuneate, prominently 3-nerved, the apex abruptly and shortly apiculate, the apiculus stout, blunt; the lateral pair of longitudinal nerves about as prominent as the midrib, extending from the base to the apex, a faint marginal pair at about 1 mm from the edge of the leaf, the transverse nerves numerous, distinct; petioles dark-brown, 1.5 to 2.5 mm long. Panicles terminal, peduncled, up to 8 cm in length, glabrous, or when young very sparingly furfuraceous, soon becoming glabrous, the scales thin, appressed, scattered. Flowers white, 4-merous, crowded at the apices of the branchlets, the subtending bracts oblong-ovate, obtuse, up to 9 mm in length, coriaceous, glabrous or obscurely furfuraceous, the bracteoles linear. Calyx-tube cup-shaped, at anthesis about 4 mm long and 5 mm in diameter, the teeth broadly triangular, about 1.5 mm long, glabrous or nearly so. Petals 4, obovate, 4 to 5 mm long.

LUZON, Tayabas Province, Mount Binuang, back of Infanta, *Bur. Sci. 28558* (type), *28695 Ramos & Edaño*, May, 1917, in forests near the summit, altitude about 1,000 meters.

This characteristic species strongly resembles *Astronia verruculosa* Merr., from which it is readily distinguished by its smaller 4-merous flowers and glabrous calyces; the leaves are also somewhat smaller and are abruptly and shortly apiculate at the apex, not acuminate. A single specimen from Mount Calinigan, Camarines Province, Luzon, collected by *D. P. Miranda*, April 24, 1914, greatly resembles the present species but differs in having shorter petioles, prominently 5-nerved leaves, and conspicuously setose-furfuraceous inflorescences.

ASTRONIA PAUCIFLORA sp. nov. § *Euastronia*.

Species *A. subcaudatae* similis et ut videtur affinis, differt ramis ramulisque laevis, castaneis, foliis crassioribus, basi 3-nerviis, utrinque minutissime verruculosis, reticulis ultimis obscuris, paniculis brevioribus, floribus confertis. Frutex 2 ad 3 m altus, partibus junioribus et inflorescentiis castaneo-lepidotis vel furfuraceo-lepidotis; foliis coriaceis vel subcoriaceis, ellipticis, usque ad 8 cm longis, utrinque subaequaliter angustatis, acuminatis, basi acutis, 3-nerviis; paniculis terminalibus, circiter 3 cm longis, paucifloris, floribus confertis, 5-meris.

A shrub 2 to 3 m high, the younger parts and inflorescences castaneous-lepidote or furfuraceous-lepidote, otherwise nearly glabrous. Branches and branchlets slender, terete, castaneous, smooth, glabrous, the ultimate ones 1.5 to 2 mm in diameter. Leaves coriaceous or subcoriaceous, elliptic, equally narrowed to the acute base and acuminate apex, 6 to 8 cm long, 2.5 to 3 cm wide, greenish or brownish when dry, dull or slightly shining, of about the same color and minutely verruculose on both surfaces, glabrous or very sparingly lepidote along the nerves on the lower surface, the base acute or decurrent-acuminate, prominently 3-nerved, the nerves extending to the apex, the apex rather prominently acuminate; transverse nerves slender, the ultimate reticulations indistinct; petioles glabrous, 1 to 1.5 cm long. Panicles terminal, about 3 cm long, castaneous-lepidote or furfuraceous, few-flowered, the flowers crowded on the ultimate branchlets, 5-merous. Bracts membranaceous, sparingly lepidote, oblong to oblong-ovate, 3 to 4 mm long. Calyx-tube about 3 mm long, sparingly furfuraceous, cup-shaped, the lobes somewhat reniform, about 1 mm long. Petals orbicular, pink to white, 3 mm in diameter.

LUZON, Tayabas Province, Mount Binuang, back of Infanta, *Bur. Sci. 28646* (type), *28780 Ramos & Edaño*, May, 1917, in forests, altitude apparently about 1,000 meters.

This species is manifestly allied to *Astronia subcaudata* Merr., the type of which was from the same locality. It is distinguished from that species especially in its thicker and verruculose leaves which are 3-nerved rather than 3-plinerved; by its castaneous, smooth branchlets; and by the ultimate reticulations of the leaves being very obscure, not conspicuous as is *A. subcaudata*.

ASTRONIA TETRAGONA sp. nov.

Arbor circiter 10 m alta, ramulis ultimis crassis, circiter 1 cm diametro, distincte 4-angulatis vel junioribus anguste 4-alatis, dense minuteque cupreo-lepidotis; foliis ellipticis, usque ad 28 cm longis, acuminatis, basi acutis, perspicue triplinerviis, supra glabris, pallide viridis, subtus uniformiter et dense lepidotis, pallide brunneis; paniculis circiter 15 cm longis, pyramidatis, e basi ramosis, floribus in ramulis ultimis subglomeratim confertis.

A tree about 10 m high, the branches stout, distinctly 4-angled, the ultimate ones about 1 cm in diameter, the younger ones sometimes distinctly 4-winged, all parts densely and minutely cupreous-lepidote. Leaves firmly chartaceous or subcoriaceous, brittle when dry, elliptic, 20 to 28 cm long, 12 to 18 cm wide, acuminate, base acute, prominently 3-plinerved, the upper surface pale greenish when dry, shining, glabrous, without cystoliths, the lower surface densely and uniformly lepidote with small, pale-brownish scales; basal nerves leaving the midrib at from 1 to 1.5 cm above the base, very prominent, extending quite or nearly to the apex, a faint secondary pair present close to the margin, but these marginal nerves not more prominent than the reticulations; lateral nerves spreading, about 25 on each side, prominent; petioles densely lepidote, 5 to 7 cm long. Panicles terminal, pyramidal, about 15 cm long, branched from the base, the branches few, stout, spreading, the lower ones sometimes 12 cm in length, the others shorter, all parts densely lepidote. Flowers rather densely crowded on the ultimate branchlets, subglomerate, 5-merous, cup-shaped, their pedicels about 2.5 mm long. Calyx about 4 mm in diameter, the teeth very short, broad.

MINDANAO, Lanao District, Lanao-Cotabato trail, *For. Bur. 25204 Alvarez* (type) March 21, 1916, in dipterocarp forests, altitude about 1,000 meters, locally known as *paera*. LUZON, Benguet Subprovince, Baguio, *Sandkuhl 240*, July and January, 1915, *For Bur. 26104 Garcia*, June, 1914: Abra Province, Mount Posuey, *Bur. Sci. 26993 Ramos*, February, 1917.

A characteristic species allied to *Astronia platyphylla* Merr., from which it is easily distinguished by its prominently 4-angled branches and branchlets.

ASTRONIA VERRUCULOSA sp. nov. § *Euastronia*.

Arbor parva, partibus junioribus inflorescentiisque exceptis glabra vel subglabra; foliis coriaceis, in siccitate utrinque minute et dense verruculosis, glabris vel subtus parcissime lepidotis, oblongo-ellipticis, usque ad 15 cm longis, utrinque subaequaliter angustatis, apice acuminatis, basi acutis, 3-nerviis; paniculis circiter 7 cm longis, furfuraceis; floribus magnis, 5-meris, circiter 6.5 mm longis, calycis urceolatis, circiter 6 mm diametro, extus lepidotis vel furfuraceo-lepidotis.

A tree about 7 m high, glabrous except the younger parts, the petioles and the inflorescences. Branches glabrous, wrinkled when dry, somewhat brownish-red, the branchlets more or less brown-furfuraceous. Leaves rather thickly coriaceous, dull, of about the same color, and pale yellowish-green on both surfaces when dry, oblong-elliptic, 10 to 15 cm long, 3 to 6 cm wide, when dry both surfaces minutely and densely verruculose, entirely glabrous, or the lower surface, when young, with few, rather large, scattered, brown, lepidote scales, about equally narrowed to the somewhat acuminate apex and to the acute base, distinctly 3-nerved, the lateral nerves extending to the apex; petioles about 3 cm long, somewhat furfuraceous on their margins, or quite glabrous. Panicles terminal, pyramidal, brown-furfuraceous, about 7 cm long, the branches few, spreading, the flowers white and pink, rather congested, the subtending bracts deciduous, oblong, 6 to 8 mm long. Calyx urceolate, brown-lepidote, about 6.5 mm long and wide, 5-toothed, the teeth broad, blunt or acute. Petals 5, orbicular-reniform, about 5 mm in diameter.

LUZON, Camarines Province, Mount Isarog, *Phil. Pl. 1569 Ramos* (type), November 23, 1913, in the mossy forest near the summit, altitude about 1,900 meters: Sorsogon Province, Mounts Pacdal and Kililibong, *Bur. Sci. 23371, 23568, 23501 Ramos*, August, 1915.

A species allied to *Astronia viridifolia* Elm., *A. megalantha* Merr., and *A. negrosensis* Merr., but distinguished from all by its coriaceous leaves being finely and densely verruculose on both surfaces. The flowers are unusually large for the genus, as in *A. megalantha* Merr.

BECCARIANTHUS Cogniaux

BECCARIANTHUS ICKISII Merr. var. **PUBERULA** var. nov.

A typo differt ramulis et petiolis perspicue setosis, foliis subtus minutissime et densissime puberulis.

LUZON, Tayabas Province, Infanta-Siniloan trail, *Bur. Sci. 29230 Ramos & Edaño*, June 12, 1917, on forested ridges.

This form differs from the type in its prominently setose branchlets and petioles, the soft setae attaining a length of 12 mm; on the petioles they are confined to the lower inner one-third to one-half, and are distinctly longer than those in the var. *setosa* Merr. The diagnosis of the latter variety, Philip. Journ. Sci., 10 (1915) Bot. 278 should be corrected by the addition of the figure 9 before the word "nerviis." The present variety, like the type, has 7-nerved leaves but differs from it and the variety *setosa* in its leaves being uniformly and densely puberulent on the lower surface, the indumentum being pale-brownish in color.

MEDINILLA Gaudichaud

MEDINILLA APAYAOENSIS sp. nov.

Frutex glaber, circiter 2 m altus, ramis ramulisque teretibus vel subteretibus; foliis oppositis, coriaceis, oblongo-ellipticis, usque ad 18 cm longis, utrinque subaequaliter angustatis, apice obtusis vel latissime et breviter acuminatis, basi acutis vel decurrento-acuminatis, 5-plinerviis, nervis transversis reticulisque subobsoletis; petiolo 1 ad 2 cm longo; paniculis terminalibus, pedunculatis, usque ad 25 cm longis, multifloris, ramis primariis verticillatis, inferioribus circiter 10 cm longis; bracteis membranaceis, lanceolatis ad oblanceolatis, 1 ad 1.4 cm longis; floribus 5-meris, petalis circiter 9 mm longis.

An erect glabrous shrub about 2 m high, the branches and branchlets terete or subterete, pale, the latter about 4 mm in diameter, the nodes sparingly setose. Leaves opposite, coriaceous, rather pale when dry, slightly shining, of about the same color on both surfaces, oblong-elliptic, 13 to 18 cm long, 6 to 8 cm wide, subequally narrowed to the blunt or very broadly blunt-acuminate apex and to the acute or decurrent-acuminate base, prominently 5-plinerved, in larger leaves sometimes 7-

plinerved, the inner pair of nerves more prominent than the outer ones and anastomosing with the midrib just below the apex, the transverse nerves and reticulations obsolete or nearly so; petioles stout, 1 to 2 cm long. Panicles terminal, pyramidal, peduncled, up to 25 cm long, the branches verticillate, the lower ones about 10 cm long, the bracts subtending the branches subpersistent, membranaceous, lanceolate to oblanceolate, 10 to 14 mm long. Flowers pale-purplish, 5-merous. Calyx cup-shaped, truncate, about 4 mm long. Petals about 9 mm long. Stamens 10, equal, the filaments and anthers each about 7 mm in length.

LUZON, Apayao Subprovince, Ngagan, *Bur. Sci. 28142 Fénix*, May 10, 1917, an epiphyte on large trees in damp forests.

The alliance of this species is with *Medinilla apoensis* C. B. Rob. (*M. confluentinervia* Elm.), of southeastern Mindanao, from which it is readily distinguished by its prominently petioled leaves, those of *M. apoensis* being sessile or subsessile.

MEDINILLA FENICIS sp. nov.

Arbor parva usque ad 8 m alta, ramis ramulisque teretibus, partibus junioribus et subtus foliis ad costa nervisque, et inflorescentiis plus minusve plumoso-tomentosis; foliis oppositis, coriaceis, oblongo-ellipticis, utrinque subaequaliter angustatis, basi acutis, 3-plinerviis, apice breviter obtuseque acuminatis, usque ad 8 cm longis; inflorescentiis terminalibus, paniculatis, laxis, usque ad 13 cm longis; bracteis membranaceis, oblongis ad obovatis, 8 ad 11 mm longis; floribus 4-meris, petalis circiter 8 mm longis.

A small tree attaining a height of about 8 m, the younger branchlets, lower surface of the leaves on the costa and nerves, and the inflorescences more or less plumose-tomentose with pale-brownish hairs, the indumentum sometimes dense, more or less deciduous, the older parts eventually becoming glabrous or nearly so. Branches and branchlets terete, pale, the former smooth, the latter 2 to 3 mm in diameter. Leaves coriaceous, oblong-elliptic, 6 to 8 cm long, 2.3 to 3 cm wide, pale-brownish, of about the same color on both surfaces, and slightly shining when dry, brittle, subequally narrowed to the acute, prominently 3-plinerved base and to the shortly and bluntly acuminate apex, the lateral nerves leaving the midrib in the lower 3 mm and extending to the apex, the transverse nerves and reticulations obsolete; petioles pubescent when young, eventually glabrous, 7 to 14 mm long. Panicles terminal, peduncled, up to 13 cm long, lax, the branches opposite. Bracts conspicuous, membranaceous, apparently pink, oblong to obovate, sparingly pubescent to glabrous, obtuse, 8 to 11 mm long. Flowers pedicelled, in threes at the tip of each ultimate branchlet, 4-merous. Calyx cup-shaped, truncate, about 4 mm long. Petals dark-purple, about 8 mm long.

LUZON, Apayao Subprovince, Mount Sulu, *Bur. Sci. 28426 Fénix*, May, 1917, on damp rocky slopes near the summit of the mountain, altitude not indicated.

A strongly marked species among those with pubescent vegetative parts, not very similar to any described form, but most closely allied to *Medinilla cordata* Merr. It is distinguised from *Medinilla cordata* by numerous characters, especially in its entirely differently shaped, prominently petioled leaves which are gradually narrowed to the acute base.

MEDINILLA LONGIDENS sp. nov.

Frutex circiter 1 m altus, perspicue plumoso-tomentosus; ramis ramulisque teretibus; foliis oppositis, valde inaequalibus, chartaceis, ovato-ellipticis ad oblongo-ovatis, minoribus usque ad 4 cm longis, majoribus usque ad 8 cm longis, acute acuminatis, basi angustatis, obtusis ad leviter cordatis, 5-plinerviis, petiolatis; inflorescentiis axillaribus, breviter pedunculatis, plerumque bifloris; bracteis conspicuis, lanceolatis, acuminatis, circiter 15 mm longis, utrinque pubescentibus; floribus 4-meris, brevissime pedicellatis, calycis lobis lanceolatis, acuminatis, 4 ad 5 mm longis.

An erect shrub about 1 m high, the branchlets, petioles, lower surface of the leaves, and inflorescences densely plumose-tomentose, the indumentum dirty brown or pale, the branches and branchlets terete, the former glabrous, pale, the latter about 2 mm in diameter. Leaves opposite, petioled, those of each pair very unequal in size, the larger ones 6 to 8 cm long and 2.5 to 3.5 cm wide, the smaller ones 3 to 4 cm long and 1.5 to 2 cm wide, chartaceous, pale-grayish when dry, acuminate or acute, base narrowed, obtuse to slightly cordate, 5-plinerved, the transverse nerves and reticulations obsolete, the upper surface glabrous; petioles of the larger leaves 8 to 12 mm long, of the smaller ones 2 to 4 mm in length. Inflorescences axillary, solitary, mostly 2-flowered, the peduncles 5 mm long or less, the flowers subtended by an involucre of pink, lanceolate, acuminate, pubescent bracts about 15 mm in length. Flowers 4-merous. Young fruit ovoid, 4-celled, pubescent, about 6 mm long, the persistent calyx-teeth lanceolate, pubescent, acuminate, 4 to 5 mm long.

LUZON, Apayao Subprovince, *Bur. Sci. 28422 Fénix*, May 23, 1917, in damp forests near the base of Mount Sulu, altitude about 800 meters.

A characteristic species strongly marked among the plumose-tomentose species by its very unequal leaves, its axillary mostly 2-flowered, conspicuously bracteate inflorescences, and its 4-merous flowers with long calyx-teeth. It somewhat resembles *Medinilla microphylla* Merr. and *M. parva* Merr., but is not very closely allied to either.

MEDINILLA MACGREGORII sp. nov.

Frutex erectus gemmis exceptis glaber, ramis ramulisque teretibus; foliis oppositis, petiolatis, oblongo-ellipticis, coriaceis, utrinque acuminatis vel basi acutis, usque ad 7 cm longis, triplinerviis, in siccitate pallidis; inflorescentiis lateralibus, laxis, paucifloris, divaricato-ramosis, usque ad 8 cm longis, bracteis suborbicularibus, prominentibus; floribus 4-meris.

An erect, slender, shrub, quite glabrous except the young buds which are densely ferruginous-setose, the very youngest branchlets also sometimes setose. Branches and branchlets slender, light-gray, terete. Leaves opposite, oblong-elliptic, 5 to 7 cm long, 2.5 to 3 cm wide, about equally narrowed at both ends, apex blunt-acuminate, base acute or acuminate, pale and somewhat shining when dry, coriaceous, 3-plinerved, the two lateral nerves leaving the midrib about 5 mm above the base and reaching the apex, there anastomosing with the midrib, the lateral nerves and reticulations obsolete; petioles 5 to 7 mm long. Inflorescence lateral, from the axils of fallen leaves, mostly solitary, slender, up to 8 cm in length, the few branches divaricately spreading, each bearing few bracteate flowers at their apices. Bracts orbicular to reniform, apparently pink, concave, submembranaceous, 5 to 6 mm long, 6 to 7 mm wide, in pairs at the nodes, the bracteoles closely enveloping the flowers, similar to the bracts but smaller. Pedicels very short. Flowers apparently pink, 4-merous. Petals 4, 5 mm long. Stamens 8; anthers oblong, about 2 mm long. Young fruits cup-shaped, 3.5 mm in diameter, truncate.

LUZON, Ifugao Subprovince, Mount Polis, *Bur. Sci. 19863 McGregor*, February 11, 1913, in the mossy forest.

A very characteristic species, distinguished by its comparatively small, pale, 3-plinerved leaves and its very lax, divaricately and slenderly branched, few-flowered, bracteate, lateral inflorescences. It is not at all closely allied to any of the known Philippine forms having opposite leaves, lateral inflorescences, and 4-merous flowers.

MEDINILLA MEMBRANACEA sp. nov.

Frutex erectus, glaber, circiter 1 m altus, ramis ramulisque teretibus; foliis ternatis, petiolatis, membranaceis, oblongis, usque ad 5 cm longis, nervis lateralibus obsoletis, basi acutis, apice acuminatis; inflorescentiis lateralibus, brevibus, subumbellatim 3-floris vel unifloris; floribus tenuiter pedicellatis, 5-meris; petalis circiter 8 mm longis.

An erect entirely glabrous shrub about 1 m high, the branches pale, terete, the branchlets very slender, 1 to 2 mm in diameter. Leaves ternate, membranaceous, olivaceous and somewhat shining when dry, oblong, 3 to 5 cm long, 1.2 to 1.8 cm wide, narrowed below to the acute base and above to the blunt-acuminate apex, the midrib distinct, the lateral nerves and reticulations entirely obsolete; petioles slender, 2 to 4 mm long. Inflorescences lateral, axillary, solitary, few, the peduncles about 8 mm long, with up to three subumbellately arranged flowers, or the flowers sometimes solitary, the slender pedicels about as long as the peduncles. Flowers white, 5-merous. Calyx cup-shaped, truncate, about 4 mm long. Petals about 8 mm long.

LUZON, Apayao Subprovince, Mount Sulu, *Bur. Sci. 28361 Fénix*, May 22, 1917, in damp forests on rocky slopes, altitude apparently about 800 meters.

A most characteristic species not at all closely allied to any other described Philippine forms, although in texture of its leaves and in the nerves and reticulations being entirely obsolete it resembles *Medinilla benguetensis* Elm.

MEDINILLA PANAYENSIS sp. nov.

Frutex glaber, 2 m altus; ramulis 4-angulatis, nodis barbatis; foliis elliptico-ovatis, oppositis, petiolatis, chartaceis, 5-plinerviis, basi acutis, apice acuminatis, usque ad 20 cm longis; inflorescentiis terminalibus, amplis, pedunculatis, paniculatis, folia subaequantibus, bracteis bracteolisque nullis; floribus 5-meris.

An erect shrub about 2 m high, glabrous except the densely setose-barbate nodes. Branches obscurely 4-angled, stout, the branchlets rather sharply 4-angled and sometimes very narrowly 4-winged. Leaves chartaceous, elliptic-ovate, opposite, about equally narrowed at both ends, the base acute, the apex acuminate, 15 to 20 cm long, 8 to 10 cm wide, somewhat brown when dry, slightly shining, the lower surface very slightly paler than the upper, with two pairs of prominent nerves, the outer pair leaving the midrib 1 to 1.5 cm above the base, evanescent at the middle or above, the inner pair leaving the midrib at from 2.5 to 3 cm above the base, anastomosing with the midrib at the apex, the transverse veinlets slender, distant, obsolete or nearly so on the lower surface, evident on the upper surface; petioles stout, 2 to 4 cm long. Inflorescence terminal, peduncled, ample, paniculate, about as long as the leaves, the rachis and branches, when fresh, waxy-white, the bracts and bracteoles wanting, or small and very early deciduous. Flowers 5-merous, pink. Calyx cup-shaped, about 5 mm long and wide, truncate. Petals 5, 10 mm long. Stamens 10, 5 slightly shorter than the others; filaments 4 to 5 mm long; anthers narrowly lanceolate, acuminate, 5 and 6.5 mm long, dorsal appendages short, the anterior one very small or nearly obsolete.

PANAY, Iloilo Province, Ulian River, *Bur. Sci. 18253 Robinson*, January 11, 1913, altitude 250 meters.

This is more closely allied to *Medinilla apoensis* C. B. Rob. (*M. confluentinervia* Elm.), than to any other Philippine form, but is very different from that species, being distinguished by its rather long-petioled leaves which have fewer nerves, and by its distinctly 4-angled, not terete branchlets.

MEDINILLA PARVIBRACTEA sp. nov.

Species *M. magnificae* affinis, differt floribus minoribus, bracteis multo minoribus, 1.5 ad 2.5 cm longis, nodis vix setosis.

An erect shrub or small tree 4 to 7 m high, quite glabrous. Branches stout, terete or obscurely 4-angled, the ultimate branchlets with 4, thick, narrow wings. Leaves opposite elliptic-ovate to somewhat obovate-elliptic, sessile, 20 to 30 cm long, 10 to 16 cm wide, coriaceous, somewhat shining, the apex shortly and abruptly acuminate, the base somewhat narrowed, prominently 11-plinerved, the interior two pairs of nerves reaching the apex, the others evanescent, the transverse nervules very slender, nearly obsolete on the lower surface. Panicles solitary, terminal and lateral, peduncled, 14 to 25 cm long, the peduncles 7 to 9 cm long, the branches in whorls of 4, spreading, the lower ones 5 to 9 cm long, each whorl subtended by 4, membranaceous, broadly ovate to oblong-obovate, obtuse to subacute, apparently colored bracts 1.5 to 2.5 cm long. Flowers pink, 5-merous. Calyx urceolate, about 4 mm long, the limb somewhat spreading, truncate, the mouth 4 mm in diameter. Petals 5, obliquely obovate, 8 mm long. Stamens 10, subequal; filaments about 5 mm long; anthers as long as the filaments, somewhat curved, acuminate, lanceolate, the dorsal spur very short, the anterior two stout, curved, about 1 mm long. Ovary 5-celled.

BABUYAN ISLANDS, Camiguin, summit of the volcano, *Bur. Sci. 4151 Fénix* (type), July 7, 1907, the inflorescence terminal. BATAN ISLANDS, Batan, Mount Iraya, *Bur. Sci. 3820 Fénix*, June 12, 1907, in forests near the summit of the mountain, inflorescence lateral. LUZON, Cagayan Province, Caua Volcano, *R. N. Clark*, August, 1908, in forests, altitude 1000 m, inflorescence terminal.

This is manifestly very closely allied to *Medinilla magnifica* Lindl., from which it differs in its smaller flowers and very much smaller bracts. The specimens with terminal inflorescence manifestly represent the same species as the one with a lateral inflorescence. In this genus it is not uncommon to find both lateral and terminal inflorescences on the same specimen, a character that is not always shown by ordinary herbarium material.

MEDINILLA PELTATA sp. nov.

Frutex glaber, ramulis 4-angulatis, crasse et anguste 4-alatis; foliis oppositis, petiolatis, ovatis ad oblongo-ovatis, coriaceis, acuminatis, base late rotundatis, distincte peltatis, 3- vel 5-nerviis; cymis usque ad 6 cm longis, caulifloris vel e ramis vetustioribus; floribus 5-meris, minutissime bracteolatis, staminibus aequalibus.

A glabrous shrub, the branches prominently 4-angled, each angle with a thick but narrow wing, pale-brownish, about 5 mm in diameter. Leaves opposite, distinctly peltate, coriaceous, ovate to oblong-ovate 10 to 13 cm long, 4.5 to 8 cm wide, the apex sharply acuminate, base broadly rounded, 3- or 5-nerved, the inner pair of nerves prominent, reaching the apex, the outer pair, when present, submarginal, evanescent below the apex; lateral nerves nearly obsolete on the lower surface, rather distinct on the upper; petioles 2 to 3.5 cm long attached to the leaf about 5 mm from its margin. Cymes up to 6 cm long, few-flowered, from the trunk or the larger branches, the minute bracteoles linear, 2 mm long or less, deciduous. Calyx cup-shaped or somewhat urceolate, about 8 mm long, the tube extending about 2.5 mm above the ovary, truncate, undulate, 5-glandular. Petals 5, obliquely oblong-obovate, about 1.4 cm long and 7 mm wide. Stamens 10, equal; filaments 8 mm long; anthers lanceolate, acuminate, curved, 8 to 9 mm long, the dorsal appendage curved, blunt, about 1.7 mm long the two anterior appendages stout, yellow, curved, about 1.5 in diameter.

BILIRAN, Mount Suiro, *Bur. Sci. 18953 McGregor*, June 10, 1914, in the mossy forest, altitude 600 to 900 meters, the flowers transparent, light phlox-purple.

A most characteristic species, at once distinguishable in the genus by its peltate leaves. According to Cogniaux's arrangement of the species it falls in the group with *Medinilla laurifolia* Blume but is not closely allied to that species or to any other form known to me.

MEDINILLA POLISENSIS sp. nov.

Species *M. clementis* affinis, differt foliis multo minoribus, usque ad 13 cm longis, basi rotundatis, 5-plinerviis, antheris majoribus.

A stout vine climbing in trees, glabrous except the setose nodes. Branches terete, somewhat reddish-brown, the younger branchlets obscurely 4-angled to prominently 4-winged, the internodes 2 to 5 cm long. Leaves opposite, coriaceous, oblong to oblong-elliptic, 8 to 13 cm long, 2 to 4 cm wide, base rounded or obtuse, apex acuminate, the upper surface pale when dry, shining, the lower somewhat brownish, the base prominently 5-plinerved, sometimes with an additional fainter basal pair, the inner pair leaving the midrib at from 2 to 3 cm above the base and reaching the apex where they anastomose with the midrib, the transverse nerves obsolete or barely visible on the upper surface; petioles about 1 cm long. Inflorescence terminal, red, long-peduncled, paniculate, the peduncle about 14 cm long, the panicle as long as the peduncle, the branches in distant whorls, the lower ones about 4 cm long. Flowers pink or pale violet, 5-merous, the bracts and bracteoles, if any, small and very early deciduous. Calyx about 6 mm long, cup-shaped, truncate. Petals 5, about 10 mm long, obliquely obovate. Stamens 10, subequal; filaments 6 to 7 mm long; anthers narrowly lanceolate, acuminate, 8 mm long, the dorsal appendage reduced to a very minute, 0.2 mm long tubercle, the anterior ones produced about 1.5 mm below the insertion of the filament, somewhat curved, oblong.

LUZON, Ifugao Subprovince, Mount Polis, *Bur. Sci. 19870 McGregor*, February 10, 1913.

Manifestly a close ally of *Medinilla clementis* Merr., differing in the characters indicated in the diagnosis.

MEDINILLA STENOBOTRYS sp. nov.

Frutex epiphyticus, glaber, circiter 2 m altus, ramulis incrassatis, 4-angulatis, 4-alatis, circiter 1 cm diametro; foliis coriaceis, oppositis, sessilis, usque ad 30 cm longis, elliptico-ovatis, acuminatis, perspicue 9-plinerviis; inflorescentiis terminalibus, trinis, angustis, multifloris, 25 ad 30 cm longis et 4 cm latis, rhachibus valde incrassatis, alatis; floribus numerosissimis, 4-meris, secus rhachin fasciculatis vel cymosis, cymis fasciculatis.

A stout, glabrous, epiphytic shrub about 2 m high, the ultimate branches 4-angled, 4-winged, about 1 cm in diameter. Leaves opposite, coriaceous, rather pale when dry, somewhat shining, sessile, elliptic-ovate, 24 to 30 cm long, 17 to 22 cm wide, apex acuminate, the acumen rather stout, about 1 cm long, the base somewhat narrowed and more or less clasping the stem, prominently 9-plinerved, lateral nerves leaving the midrib in the lower 9 to 11 cm, the inner two pairs reaching the tip of the leaf, the transverse nerves and reticulations lax, obscure. Inflorescences terminal, each branchlet terminated by three stout, narrow, racemose panicles 25 to 30 cm in length and about 4 cm in diameter, the rachis stout, about 1 cm in diameter when dry, the membranaceous wings 2 to 4 mm in width, the peduncles 8 to 10 cm long. Flowers 4-merous, dark-pink, very numerous, fascicled or cymose and the cymes fascicled at the nodes of the rachis, often crowded. Calyx cup-shaped, truncate, about 4 mm long. Petals 4, oblong-obovate, somewhat oblique, 7 to 8 mm long. Stamens 8, equal, the filaments and anthers each about

4 mm long; pedicels about 5 mm long; bracts membranaceous, oblong-ovate, rather deciduous, up to 9 mm in length.

LUZON, Apayao Subprovince, Mount Sulu, *Bur. Sci. 28355 Fénix*, May 23, 1917, on trees along streams in damp forests, altitude about 800 meters, known to the Ibanags as *lalannug*.

Among all the Philippine species with very large, opposite, sessile or nearly sessile leaves this is the most strongly characterized one. It is readily recognized by its narrow, rather dense, raceme-like inflorescences which are borne in threes at the tips of the branchlets, a type of inflorescence otherwise not known among the numerous Philippine representatives of the genus.

MEDINILLA TAYABENSIS sp. nov.

Frutex epiphyticus, glaber, ramis ramulisque teretibus vel ramulis plus minusve 4-angulatis; foliis oppositis, petiolatis, crasse coriaceis, ellipticis ad late elliptico-ovatis, in siccitate brunneo-olivaceis, usque ad 17 cm longis, basi late acutis ad rotundatis, perspicue 7- vel 9-plinerviis, apice abrupte et brevissime rostrato-acuminatis; paniculis terminalibus, 20 ad 30 cm longis, crasse pedunculatis, pyramidatis, ramis ramulisque verticillatis, incrassatis et cum pedunculo rhachibusque tenuiter 4-alatis, bracteis lineari-lanceolatis, inconspicuis, 2 ad 3 mm longis; floribus 4-meris, petalis circiter 8 mm longis.

An epiphytic glabrous shrub, the branches and branchlets terete, or the latter inconspicuously 4-angled and 4 to 5 mm in diameter, the nodes more or less setose. Leaves opposite, thickly coriaceous, brownish-olivaceous, of about the same color on both surfaces, and somewhat shining when dry, elliptic to broadly elliptic-ovate, 12 to 17 cm long, 7 to 12 cm wide, base broadly acute to rounded, conspicuously 7- or 9-plinerved, the inner pair of nerves anastomosing with the midrib near the apex, the transverse reticulations lax, obsolete on the lower surface, obscure on the upper surface, the apex very shortly and abruptly rostrate-acuminate, the acumen blunt, 2 to 3 mm long and as wide as long; petioles stout, 1 cm long or less. Panicles terminal, peduncled, pyramidal, 20 to 30 cm long, the peduncle and rachis stout, when dry and more or less flattened nearly 1 cm wide, narrowly 4-winged, the wings 1 to 2 mm wide, membranaceous, the branches and branchlets stout and similarly winged; branches verticillate, the lower ones up to 10 cm in length, the secondary and tertiary branchlets also verticillate. Flowers numerous, 4-merous, pink, their pedicels about 5 mm long, the bracts inconspicuous, linear-lanceolate, 2 to 3 mm long. Calyx cup-shaped, truncate, about 4 mm long. Petals 4, about 8 mm long. Stamens 8, equal, the filaments and anthers each about

4 mm long. Fruits ovoid-globose, truncate, 5 to 6 mm in diameter.

LUZON, Tayabas Province, Mount Binuang, *Bur. Sci. 28605* (type), *28637 Ramos & Edaño*, May 7, 1917, on trees in the mossy forest.

The alliance of this species is apparently with *Medinilla negrosensis* Merr., from which is distinguished by its differently shaped, much thicker leaves which are abruptly and very shortly blunt-acuminate; and the stout peduncles, branches, and branchlets of its inflorescences which are narrowly 4-winged.

MEDINILLA TRIANAE sp. nov.

Frutex scandens, glaber, ramis ramulisque teretibus; foliis verticillatis, petiolatis, oblongo-ellipticis ad oblongo-obovatis, chartaceis vel subcoriaceis, nitidis, 5 ad 9 cm longis, apice breviter abrupteque acuminatis, basi angustatis, acutis vel acuminatis, tenuiter trinerviis; inflorescentiis e ramis defoliatis, brevibus, paucifloris, 2 ad 3 cm longis; fructibus 4-locellatis.

A scandent glabrous shrub, the branches and branchlets terete, the latter slender, nodes not bearded. Leaves verticillate, 3 to 5 at each node, oblong-elliptic to oblong-obovate, 5 to 9 cm long, 2 to 4.5 cm wide, shining and of about the same color on both surfaces when dry, slightly pustulate, the apex very abruptly and shortly acuminate or obtuse, the base narrowed and acute or somewhat decurrent-acuminate, slenderly 3-nerved, the lateral pair nearly or quite reaching the apex, transverse nerves and reticulations obsolete or very obscure; petioles 1 to 2.5 cm long. Inflorescences from the nodes on the branches below the leaves, short, few-flowered, 2 to 3 cm long. Flowers not seen. Fruit red, 4-celled, fleshy when fresh, urceolate, about 1 cm long, the ovoid portion crowned by the short, cylindric, truncate calyx-rim.

LUZON, Laguna Province, Dahican, *Phil. Pl. 1131 Ramos*, September, 1912, in forests along the river.

A species manifestly allied to *Medinilla subumbellata* Merr., which it resembles in vegetative characters, although differing in size and other details of the leaves.

MEDINILLA VULCANICA sp. nov.

Frutex erectus, glaber, ramis ramulisque teretibus; foliis oppositis, ellipticis ad ovato-ellipticis, subcoriaceis, usque ad 20 cm longis, brevissime acuminatis, basi rotundatis vel subacutis, sessilis, 7-plinerviis, reticulis obsoletis; paniculis terminalibus, multifloris, pedunculatis, ramis ramulisque verticillatis, folia aequantibus vel longioribus; floribus parvis, 4-meris.

An erect, entirely glabrous shrub or small tree (5 m high, fide Ramos). Branches and branchlets terete, the nodes not at all setose. Leaves subsessile, elliptic to elliptic-ovate, subcoriaceous, somewhat shining when dry, the lower surface a little paler then the upper one, 9 to 20 cm long, 5.5 to 11 cm wide, the base rounded or subacute, the apex abruptly and very shortly acuminate; petiole none or very short and stout; base 7- rarely 9-plinerved, the inner two pairs reaching to the apex or nearly so, prominent, the reticulations obsolete. Panicles terminal, peduncled, the peduncles about 8 cm long, the panicles ovoid, up to 15 cm long, the branches and branchlets whorled, the lower branches up to 7 cm in length, the upper ones gradually shorter. Flowers pink, 4-merous, their pedicels 4 to 7 mm long, the bracteoles linear or filiform, short, deciduous. Calyx somewhat urceolate-campanulate, about 3.5 mm long, truncate. Petals 4, obliquely obovate, 7 mm long, about 4 mm wide. Stamens 8, equal or subequal; filaments 4 mm long; anthers as long as the filaments, lanceolate, acuminate, the dorsal spur less than 0.5 mm long, the anterior basal appendages short, blunt, rather broad.

CAMIGUIN DE MINDANAO, in forests on slopes of the volcano, *Phil. Pl. 1164 Ramos*, March 24, 1912.

A species closely allied to *Medinilla myriantha* Merr. *M. confusa* Merr. and allied forms, distinguished by its 7-plinerved leaves, small flowers, etc.

MEDINILLA TENUIPES nom. nov.

Medinilla gracilipes Merr. in Philip. Journ. Sci. 8 (1913) Bot. 249, non *M. gracilipes* Merr. op. cit. 236.

Inadvertently the same specific name was ued for two entirely distinct and unrelated species, both of which were published in the same paper. The second species published under the name *Medinilla gracilipes* is here renamed *Medinilla tenuipes* Merr.

MELASTOMA Linnaeus

MELASTOMA CULIONENSE sp. nov.

Frutex erectus, ramulis et foliis et calycis adpresse strigosis; foliis chartaceis, oblongo-lanceolatis, acuminatis, basi acutis, 5-nerviis, usque ad 9 cm longis, supra adpresse strigosis, subtus leviter strigoso-setulosis; floribus 5-meris, bracteatis, calycibus haud dense strigosis, tubo quam lobis paulo brevioribus, denticulis alternantibus ad setis reductis; antherarum majorum connectivum basi longe productum.

An erect shrub, the branches brown, terete or nearly so, glabrous, the younger branchlets appressed-strigose, the scales not dense and 1 mm long or less. Leaves chartaceous, oblong-lanceolate, 6 to 9 cm long, 1.5 to 2.3 cm wide, apex rather slenderly and sharply acuminate, base acute, the upper surface olivaceous when dry, appressed strigose with scattered, very short scales, the lower surface paler, sparingly strigose-setulose on the midrib, nerves, and reticulations; nerves 5 from the base, distinct; petioles appressed hirsute-strigose, 5 to 10 mm long. Flowers solitary in the uppermost axils or in few flowered terminal cymes, each young flower subtended by a pair of oblong-lanceolate, strigose, acuminate bracts about 8 mm long, these bracts somewhat penicillate at the apex, deciduous, more or less enclosing the young buds. Calyx-tube 6 to 7 mm long, sparingly appressed-strigose with entire, sharp scales less than 1 mm in length, these scales scattered, not at all obscuring or covering the surface of the tube, the lobes 5, lanceolate, acuminate, about 8 mm long, appressed strigose, apex slightly penicillate, the alternating teeth reduced to mere bristles 2 mm long or less. Petals 5, oblong-obovate, about 2 cm long, 11 mm wide, apex obtuse or rounded and a little penicillate. Stamens 10, very unequal; the five longer ones with anthers about 7 mm long, lanceolate, acuminate, the connective produced about 12 mm below the anther, with small anterior appendages, the filaments proper 8 to 10 mm long; the five shorter stamens with anthers equaling those of the longer stamens, but the connectives produced but about 1 mm, the filaments about 8 mm long.

CULION, Halsey Harbor, *Bur. Sci. 21647 Escritor*, August 25, 1913.

The alliance of this species is manifestly with *Melastoma malabathricum* Linn. as interpreted by Cogniaux, but is so distinct that it cannot properly be referred to that species nor to any of the forms that have been reduced to it. It is strongly characterized by its slightly strigose calyx, the strigose scales scattered, not at all imbricate or overlapping and not nearly covering the surface of the calyx tube; its lobes a little longer than the tube; and the alternating teeth reduced to mere bristles 2 mm long or less which are not at all penicillate or hairy in any respect.

MELASTOMA SUBALBIDUM sp. nov.

Frutex erectus 1 ad 1.5 m altus, ramulis et foliis et calycis brevissime adpresse strigosis; foliis oblongis vel oblongo-lanceolatis, usque ad 5 cm longis, 5-nerviis, acute acuminatis, subtus pallidis; floribus 5- vel 6-meris, parvis, albidis vel subalbidis, petalis circiter 1.3 cm longis, staminibus subaequalibus, connectivo basi brevissime producto.

An erect shrub 1 to 1.5 m high, the branches terete, pale grayish-brown, glabrous, the branchlets very slender, densely strigose with short, strictly appressed lanceolate, acuminate, usually purplish scales hardly exceeding 1 mm in length. Leaves oblong to oblong-lanceolate, chartaceous, 3 to 5 cm long, 1 to 1.5 cm wide, the upper surface green when dry, sparingly appressed-strigose with scattered, appressed, short, sharp scales, the lower surface much paler than the upper, glabrous except for the sparingly appressed-strigose nerves and reticulations, the apex rather sharply acuminate, the base obtuse or rounded, 5-nerved; petioles densely strigose, 5 mm long or less. Flowers white or very pale-pink, in few-flowered, terminal, ebracteate cymes, the cymes 2 to 3 cm long, the flowers rarely or never exceeding 9 in each. Calyx ovoid, including the lobes about 1 cm long, outside very densely strigose with simple, closely appressed, narrowly ovate, acuminate, usually purplish scales, the tube ovoid, about 6 mm long and 5.5 mm in diameter, the lobes 5 or 6, lanceolate, about 4 mm long, densely strigose, alternating with very small, 1.5 mm long scales scarcely larger than those on the tube. Petals 5 or 6, obovate, nearly equilateral, about 1.3 cm long, 9 mm wide, apex broadly rounded-truncate, margins more or less ciliate. Stamens 10 or 12, slightly unequal, the longer filaments 7 mm long, the shorter 6 mm, the anthers oblong, obtuse, straight, the longer ones 3 mm long, connectives produced 1 mm, the shorter ones 2.5 mm long, the connectives produced 0.5 mm, the anterior appendages in both curved, 0.5 mm long. Ovary 5- or 6-celled, the apex subconical, densely hirsute.

LUZON, Ifugao Subprovince, Mount Polis, *Bur. Sci. 19835 McGregor*, February, 1913.

A very characteristic species, belonging in the third group, as outlined by Cogniaux, with *Melastoma denticulatum* Bl., *M. mariannum* Naud., *M. sylvaticum* Bl., and *M. francavillanum* Cogn. Striking characters are its small leaves, somewhat glaucous beneath and glabrous on the lower surface except for the nerves and reticulations, its small, nearly white flowers, and its short anthers which are slightly unequal in length, the connectives produced but 0.5 to 1 mm.

OTANTHERA Blume

OTANTHERA PARVIFLORA sp. nov.

Frutex circiter 1 m altus omnibus partibus longe penicillato-setosis; foliis chartaceis, oblongis, acuminatis, usque ad 9 cm longis, basi acutis, 5-nerviis; paniculis terminalibus, paucifloris; floribus 5-meris, circiter 1 cm diametro.

A shrub about 1 m high, all parts supplied with spreading, slender, setose hairs 3 to 4 mm in length, those on the leaves usually pale, those on the branchlets and inflorescence purplish. Branches gray, terete, slender, setose-penicillate. Leaves oblong, chartaceous, green and of about the same color on both surfaces when dry, 5 to 9 cm long, 1.5 to 3 cm wide, apex acuminate, base acute, rarely somewhat rounded, 5-nerved, the outer pair of nerves more slender than the inner ones, both surfaces setose-penicillate; petioles 8 to 10 mm long. Panicles terminal, few-flowered, the bracts green, sessile, reniform-ovate, acuminate, 3 to 4 mm long, the pedicels about 3 mm long. Flowers 5-merous, pink. Calyx cup-shaped, 4 to 5 mm long, densely covered with spreading purplish hairs 3 to 4 mm in length, the lobes linear-lanceolate, 3 mm long, setose-penicillate. Petals (from nearly mature buds) orbicular-ovate, 4 to 5 mm long, margins ciliate, apex penicillate. Stamens 10, equal; anthers oblong, 2 mm long. Fruit globose, about 5 mm in diameter.

MINDANAO, Zamboanga District, Sax River Mountains back of San Ramon, *Merrill 8082*, November 28, 1911, in damp shaded ravines on talus slopes, and on ridges, altitude 800 to 1100 m, rare.

A species well characterized by its small flowers, in this readily distinguishable from the other species of the genus.

OTANTHERA MACGREGORII sp. nov.

Frutex 1.5 ad 2 m altus, erectus, ramis ramulisque gracilis, teretibus vel obscure tetragonis; foliis oblongis vel oblongo-ovatis, acuminatis, basi 5-nerviis, supra adpresse strigosis, subtus ad nervis nervulisque setoso-strigosis; floribus 5-meris calycis setis simplicibus, curvato-adpressis, strigosis, lobis lanceolatis, 5 mm longis; petalis roseis, 6 mm longis.

An erect shrub, 1.5 to 2 m high, the branches and branchlets terete or obscurely 4-angled, very slender, uniformly and rather densely appressed-strigose, brownish when dry. Leaves oblong to oblong-ovate, chartaceous, 5 to 8 cm long, 1.5 to 2.5 cm wide, the apex acuminate, base acute, 5-nerved, the upper surface uniformly appressed-strigose, the setae 1 to 2 mm long, the lower surface setose-strigose with somewhat curved setae on the nerves and reticulations; petioles about 5 mm long, strigose. Panicles terminal and axillary, few-flowered, usually about 2 cm long, sessile or peduncled, the bracts narrowly ovate, acuminate, setose, about 3 mm long. Flowers 5-merous. Calyx-tube globose, about 5 mm in diameter, covered with curved-appressed simple setae about 1 mm in length, the lobes lanceolate, acuminate, as long as the tube, ciliate-setose. Petals pink, broadly obovate, 6 mm long, 7-nerved, reticulate, equilateral, the apex broad, subtruncate, the margins slightly ciliate-setose. Stamens 10, equal; filaments about 2.5 mm long; anthers as long as the filaments, narrowly oblong, obtuse, the connective not at all produced, the anterior basal appendages two, very short. Style 5 mm long.

LUZON, Nueva Vizcaya Province, Imugan, *Bur. Sci. 14408 McGregor*, April 26, 1912.

This species is manifestly allied to *Otanthera celebica* Blume, differing however in many characters, but especially in its calyx-lobes being more than twice as long as in Blume's species and equaling the tube in length.

MEMECYLON Linnaeus

MEMECYLON OBSCURINERVE sp. nov. § *Eumemecylon.*

Frutex glaber, ramis ramulisque teretibus; foliis oblongis ad oblongo-ovatis, usque ad 6 cm longis, coriaceis, brevissime petiolatis, crasse coriaceis, acuminatis, basi acutis ad obtusis, supra olivaceis, subtus flavo-viridis, nervis lateralibus et transversabus subobsoletis; inflorescentiis axillaribus, fasciculatis, circiter 2.5 cm longis, floribus numerosis, albidis, calycis circiter 2 mm diametro.

A glabrous shrub about 3 m high, the branches and branchlets brownish, terete, the latter smooth, about 1.5 mm in diameter. Leaves thickly coriaceous, oblong to oblong-ovate, 4 to 6 cm long, 1.5 to 3 cm wide, apex acuminate, base acute to obtuse, the upper surface olivaceous when dry, the lower yellowish-green; lateral longitudinal nerves very obscure, scarcely visible, becoming obsolete in the upper part of the leaf, the transverse ones no more distinct than the longitudinal ones, about 6 on each side of the midrib, reticulations obsolete; petioles stout, 1 to 2 mm long. Inflorescences mostly in the axils of fallen leaves, fascicled, peduncled, about 1.5 cm long, the peduncles 4 to 7 mm long, mostly reduced to simple umbels, the larger ones with short secondary branches. Flowers numerous, white, their pedicels about 2 mm long, the calyces about 2 mm in diameter.

LUZON, Nueva Ecija Province, Mount Umingan, *Bur. Sci. 26401 Ramos & Edaño*, August 20, 1916, on forested slopes, altitude about 400 meters.

A species well characterized by its obscurely nerved leaves, the transverse and lateral nerves present but scarcely more than visible, the reticulations obsolete. Its alliance is apparently with *Memecylon lanceolatum* Blanco, but it is entirely different from Blanco's species.

MEMECYLON OLIGOPHLEBIUM sp. nov. § *Eumemecylon.*

Frutex glaber circiter 3 m altus, ramis ramulisque tenuibus, teretibus, vel ramulis ultimis obscurissime sulcatis; foliis ellipticis, coriaceis, usque ad 5 cm longis, abrupte et breviter acuminatis, basi acutis vel decurrento-acuminatis, obscure triplinervis, nervis lateralibus patulis, utrinque circiter 6, supra impressis, subtus magis indistinctis, anastomosantibus, nervis secundariis reticulisque obsoletis; infructescentiis 1 ad 2 cm longis, pedunculatis vel e basi ramosis; fructibus globosis, circiter 5 mm diametro.

A glabrous erect shrub about 3 m high, the branches and branchlets slender, terete, dark reddish-brown, smooth, or the ultimate branchlets sometimes very obscurely sulcate. Leaves elliptic, thickly coriaceous, 3.5 to 5 cm long, 2 to 3 cm wide, apex abruptly and shortly acuminate, base acute or decurrent-acuminate, the upper surface strongly shining, brownish-olivaceous, the lower somewhat paler, the midrib very prominent on the lower surface; lateral nerves about 6 on each side of the midrib, spreading, straight, anastomosing with the arcuate longitudinal pair of nerves at from 3 to 5 mm from the margin, the base obscurely triplinerved, all nerves impressed on the upper surface, less distinct on the lower surface than on the upper, the secondary ones and reticulations obsolete; petioles 4 to 5 mm long. Infructescences axillary, solitary, 1 to 2 cm long, peduncled or branched from the base, the fruits somewhat crowded at the ends of the primary branches, globose or depressed-globose, about 5 mm in diameter, subsessile or very shortly pedicelled.

MINDANAO, Surigao Province, Managas, Carrascal, *For. Bur. 26475 Mallonga*, December 13, 1916, on dry slopes, altitude about 50 meters.

This species is well characterized by its small, elliptic, thickly coriaceous, abruptly and shartly acuminate leaves, with the slender nerves impressed on the upper surface, the lateral spreading ones straight, and the longitudinal connecting nerves arcuate and distant from the margin of the leaf.

MEMECYLON PACHYPHYLLUM sp. nov. § *Eumemecylon.*

Frutex 3 ad 4 m altus, glaber, ramis ramulisque teretibus; foliis crassissime coriaceis, sessilis, ovatis ad elliptico-ovatis, vel oblongo-ovatis, usque ad 12 cm longis, basi late rotundatis vel obscurissime cordatis, apice obtusis ad rotundatis, nervis transversalibus circiter 10, tenuibus, lateralibus obscuris, leviter arcuatis; paniculis axillaribus vel e axillis defoliatis, usque ad 3 cm longis, ramis brevibus, patulis; fructibus ovoideis, circiter 6 mm longis.

A glabrous shrub 3 to 4 m high, the branches and branchlets rather stout, terete, the latter smooth, reddish-brown, shining. Leaves very thickly coriaceous, stiff, sessile, ovate, elliptic-ovate, or oblong-ovate, brownish-olivaceous, shining, of the same color on both surfaces when dry, 7 to 12 cm long, 3.5 to 6.5 cm wide, base very broadly rounded or sometimes obscurely cordate, apex broadly rounded to obtuse, margins somewhat revolute; transverse nerves about 10 on each side of the midrib, slender, not prominent, rather more distinct than are the longitudinal lateral nerves which are slightly arched between the ends of the transverse ones. Inflorescences axillary and from the axils of fallen leaves, solitary or sometimes two in an axil, up to 3 cm long, the branches spreading. Fruits ovoid, about 6 mm long.

LUZON, Nueva Ecija Province, Mount Umingan, *Bur. Sci. 26475* (type), *26464 Ramos & Edaño*, August, 1914, altitude 250 to 350 meters: Tayabas

Province, Mount Binuang, near Infanta, *Bur. Sci. 9383 Robinson*, August, 1909, altitude 875 meters, *Bur. Sci. 28666 Ramos & Edaño*, May 27, 1917.

A species characterized by its very thick, round to broadly obtuse, sessile leaves. It is perhaps as closely allied to *Memecylon diversifolium* Presl, as any other species, but cannot be referred to Presl's species, the type of which was from Malacca, not from the Philippines, and which proves to be a synonym of *Memecylon coeruleum* Jack.

MEMECYLON SYMPLOCIFORME sp. nov. § *Eumemecylon.*

Frutex glaber, circiter 5 m altus, ramis ramulisque teretibus, tenuibus; foliis coriaceis, oblongo-ellipticis ad oblongo-lanceolatis, usque ad 8 cm longis, petiolatis, utrinque subaequaliter angustatis acuminatisque, nervis reticulisque obsoletis; infructescentiis axillaribus, brevibus, fructibus ellipsoideis vel oblongo-ovoideis, circiter 1 cm longis, basi distincte inaequilateralibus.

A glabrous shrub about 5 m high, the branches and branchlets slender, terete, the ultimate branchlets less than 1 mm in diameter, brownish or pale. Leaves greenish-olivaceous, slightly shining, the midrib prominent, the lateral nerves and reticulations obsolete on both surfaces, coriaceous, oblong-elliptic to oblong-lanceolate, 5 to 8 cm long, 1.8 to 3 cm wide, subequally narrowed to the acuminate base and to the rather slenderly acuminate apex; petioles 2 to 3 mm long. Infructescences axillary and from the axils of fallen leaves, the peduncles about 5 mm long, simple or with two short branches at the apex, each bearing one or two fruits. Fruits ellipsoid or oblong-ovoid, about 1 cm long, brown and smooth when dry, the base distinctly inequilateral, rounded on one side, acute on the other.

LUZON, Tayabas Province, Pacific coast, vicinity of Mount Dingalan, *Bur. Sci. 26598 Ramos & Edaño*, August 27, 1916, on slopes, altitude about 195 meters, the fruits described as white when fresh, the local (Bulugo) name *ambatiki*.

A species well characterized by its acuminate, nerveless leaves and its somewhat elongated fruits which are distinctly inequilateral at the base. In aspect it rather strongly resembles some species of *Symplocos*. Its alliance is apparently with *Memecylon lanceolatum* Blanco and *M. gitingense* Elm., from both of which it is at once distinguished by its fruit characters.

MEMECYLON TAYABENSE sp. nov.

Arbor circiter 10 m alta, glabra, ramis 4-angulatis, ramulis prominente 4-alatis; foliis oblongis, coriaceis, nitidis, in siccitate utrinque pallide viridis, usque ad 22 cm longis, acuminatis, basi late rotundatis cordatisque, brevissime petiolatis, nervis supra impressis, subtus valde prominentibus, transversalibus utrinque 12 ad 15, rectis, cum lateralibus valde prominentis leviter arcuatis anastomosantibus; inflorescentiis terminalibus, e basi ramosis, circiter 7 cm longis, paniculatis, ramis oppositis, ramulis subverticillatis, ramulis 4-angulatis; floribus breviter pedicellatis, in ramulis ultimis subcapitato confertis.

A tree about 10 m high, entirely glabrous. Branches dark-brown, distinctly 4-angled, the branchlets paler, 4-angled and narrowly 4-winged, the wings about 1 mm wide. Leaves opposite, coriaceous, pale-greenish when dry, of the same color and shining on both surfaces, 18 to 22 cm long, 5.5 to 7 cm wide, somewhat narrowed upward to the acuminate apex, the base broadly rounded, cordate, subsessile, the petioles at most 1.5 mm long; nerves impressed on the upper surface, very prominent on the lower, the transverse ones straight or nearly so, 12 to 15 on each side of the midrib, anastomosing at from 5 to 8 mm from the margin with the slightly arched, equally prominent, longitudinal nerves which extend from the base nearly or quite to the apex; primary reticulations lax, faint, the others obsolete. Panicles terminal, about 7 cm long, paniculate, branched from the base, the branches opposite, the branchlets verticillate, the lower primary branches up to 6 cm in length, all distinctly 4-angled, dark-brown when dry. Flowers numerous, shortly pedicelled, densely crowded in globose, subcapitate, partial inflorescences about 1 cm in diameter at the tips of the ultimate branchlets.

LUZON, Tayabas Province, Atimonan, *For. Bur. 24932 Bawan*, December 12, 1915, on forested ridges, altitude about 200 meters, locally known as *guis-guis*.

A characteristic species in the alliance with *Memecylon terminaliflorum* Elm. and *M. pteropus* Merr., differing from the latter in its sessile, much shorter inflorescences and larger leaves, and from the former especially in its globose, subcapitate partial inflorescences, its differently shaped, thicker leaves, its prominently 4-winged branchlets, and its sessile inflorescences.

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SOME RECENTLY COLLECTED PHILIPPINE FUNGI

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The partial results of a study of some of the more recent collections of Philippine fungi are presented in the present paper. Some apparently new forms are described, and a considerable number of previously described species are listed.

Within the past two or three years many specimens of fungi have been sent to European specialists for study, but on account of the unsettled conditions due to the present war no reports on these specimens have been received. However, none of the material of which duplicates have been sent to specialists has been discussed by me in the present paper. None of the *Basidiomycetes* are reported in this contribution although a number of forms, especially in the *Uredinaceae,* have been determined and several apparently undescribed species have been located. No attempt has been made to determine the recently collected *Polyporaceae.* The Philippine forms of this group are now in a most chaotic condition and the study of them could best be made by some specialist who has comprehensive collections from all parts of the world with access to types and authentically named specimens.

It is of interest to note that in all of our recently collected material forms referable to the genera *Meliola* and *Asterina* are especially numerous. This may in part be explained by the fact that the representatives of these genera are for the most part inconspicuous forms which may have been overlooked by previous collectors. The genus *Meliola* has by far more known species in the Philippines than any other genus of the *Ascomycetes,* while *Asterina* is second in this respect.

The host relations of our species of *Meliola* and *Asterina* are in great need of careful field and laboratory study. Many of the species of the former genus appear to be restricted to a single host, or at most to representatives of the same genus or family; but a few species have been reported on hosts belonging in more than one family of higher plants.

CENANGIACEAE

TRYBLIDIELLA Saccardo

TRYBLIDIELLA MINDANAENSIS P. Henn. in Philip. Journ. Sci. 3 (1913) Bot. 53.

ALABAT, back of Sangirin, *Merrill 10529*, December 25, 1916. On dead stems of *Premna*.

PHACIDIACEAE

RHYTISMA Fries

RHYTISMA LAGERSTROEMIAE Rabh. in Hedw. 17 (1878) 31.

Rhytisma pongamiae Berk. & Br. ex Cooke in Grev. 6 (1877) 110.

LUZON, Rizal Province, *Bur. Sci. 26753 Ramos*, October-November, 1916; Antipolo, *Bur. Sci. 17382 Ramos*, January, 1914: Bataan Province, Mount Mariveles, *Bur. Sci. 16763 Graff*, April, 1912. On the leaves of *Lagerstroemia speciosa*.

PERISPORIACEAE

MELIOLA Fries

MELIOLA AFFINIS Syd. in Leafl. Philip. Bot. 6 (1913) 192.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25699 Yates*, December, 1916. On leaves of *Memecylon* sp.

MELIOLA DESMODI Karst. et Roum. in Revue Myc. (1890) 77.

LUZON, Bulacan Province, Angat, *Bur. Sci. 21785 Ramos*, September, 1913. On the leaves of *Desmodium latifolium*.

MELIOLA HAMATA Syd. in Ann. Myc. 12 (1914) 548.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25659 Yates*, December, 1916. On the leaves of *Buchanania arborea*.

MELIOLA HEWITTIAE Rehm in Philip. Journ. Sci. 8 (1913) Bot. 253.

LUZON, Cavite Province, Talisay Ridge, *Merrill 10632*, January 21, 1917: Bulacan Province, Angat, *Bur. Sci. 21847 Ramos*, September, 1913. On the leaves of *Hewittia sublobata*.

MELIOLA ARTOCARPIAE sp. nov.

Mycelio epiphyllo, plagulas atras, orbiculares, 3-5 mm diam., ex hyphis sparsis brunneis septatis 8-10 μ crassis composito, ramis irregularibus; hyphopodiis capitatis numerosis, alternantibus vel irregularibus, cellula superiore globosa, 15 μ lata, vel elongata et 24 μ longa, 18 μ lata, cellula inferiore 10-12 μ longa; hyphopodiis mucronatis, paucis, irregularibus, ampulliformibus, 15-20 μ longis; setis mycelicis numerosis, 350-500 μ longis, erectis, ad basim abrupte geniculatis et 10 μ crassis, inferne atris et opacis, superne obscure brunneis, acutis vel obtusis; peritheciis numerosis, 100-200 μ diam., globosis, atris, opacis, tuberculatis; ascis 2-4-sporis, 70-80 x 20-35 μ; sporidiis brun-

neis, 4-septatis, cylindraceis, ad septa constrictis, utrinque late rotundatis 50-55 μ longis, 20-25 μ latis.

SAMAR, Catubig River, *Bur. Sci. 24692 Ramos*, February 7, 1916. On leaves of *Artocarpus* sp.

The specimens are parasitized by *Spegazzinia meliolae* A. Zimm.

MELIOLA BARRINGTONIAE sp. nov.

Epiphylla, maculas orbiculares 2-4 mm diam., saepe confluentes, atras; mycelio ex hyphis paucis flexuosis radiantibus irregulariter ramosis brunneis septatis 10 μ latis composito; hyphopodiis capitatis numerosis, plerumque oppositis, vel alternantibus, cellula superiore globosa 12-14 μ lata; cellula inferiore 5 μ longa; hyphopodiis mucronatis paucis, ampulliformibus, usque ad 20 μ longis, 12 μ latis; setis mycelicis numerosis, atris, opacis, validis, 200-300 μ longis, 12-18 μ latis, erectis, rectis vel leviter curvatis, acutis; peritheciis globosis, atris, opacis, tuberculatis, 140-200 μ diam.; ascis ellipsoideis, 4-sporis, evanescentibus, 50-60 μ longis, 18-22 μ latis; sporidiis cylindraceis, utrinque late rotundatis, 4-septatis, ad septa constrictis, brunneis, 40-45 μ longis, 14-18 μ latis.

LUZON, Cavite Province, *Bur. Sci. 22600 Ramos & Deroy*, April 18, 1916. On leaves of *Barringtonia luzonensis*.

The rather short, thick setae are characteristic.

MELIOLA CADIGENSIS sp. nov.

Hypophylla, maculas atras 5-8 mm diam., dein confluentes et plus minusve effusa formans; mycelio ex hyphis septatis 6-7 μ diam. obscure brunneis composito, ramis oppositis vel irregularibus; hyphopodiis capitatis numerosis, oppositis vel irregularibus, cellula superiore rotundata, 12-14 μ longa, 10 μ lata, inferiore 5 μ longa; hyphopodiis mucronatis numerosis, ampulliformibus, usque ad 20 μ longis; setis mycelicis numerosissimis, erectis, ad basim geniculatis, 450-550 μ longis, 10 μ crassis, atris, opacis; peritheciis numerosis in quaque macula, globosis, tuberculatis, 130-170 μ diam.; ascis non visis; sporidiis cylindraceis, utrinque late rotundatis, 4-septatis, ad septa constrictis, obscure brunneis, 35-40 μ longis, 14-16 μ latis.

LUZON, Tayabas Province, Mount Cadig, *Bur. Sci. 25822 Yates*, December 16, 1916. On leaves of *Glycosmis cochinchinensis*.

MELIOLA CATUBIGENSIS sp. nov.

Amphigena, plerumque epiphylla, maculas atras, orbiculares, 5-10 mm diam., vel confluentes et folium superficium plus minusve continua obtecta, mycelio ex hyphis brunneis septatis ramosis 8-10 μ crassis composito; hyphopodiis capitatis numerosis, alternantibus, cellula superiore globosa vel ovata, 12 μ diam., inferiore

5 μ longa; hyphopodiis mucronatis paucis, plerumque oppositis, ampulliformibus, usque ad 15 μ longis; setis mycelicis 250 μ longis, 8-10 μ latis, erectis, rectis vel leviter curvatis, inferne atris, opacis, apicem versus septatis, obscure brunneis, obtusis; peritheciis paucis, minutis, 60-80 μ diam., globosis, obscure brunneis, subopacis, tuberculatis; ascis non visis; sporidiis 4-septatis, ad septa constrictis, cylindraceis, utrinque late rotundatis, brunneis, 30-34 μ longis, 12-15 μ latis.

SAMAR, Catubig River, *Bur. Sci. 24624 Ramos*, February 17, 1916. On leaves of *Loranthus*.

Meliola loranthi Gaill. the only other species of *Meliola* recorded as occurring on *Loranthus* is described as having the mycelial setae forked. The perithecia in *M. loranthi* are described as 150-200 μ in diameter, and the spores 62-68 x 24-26 μ.

MELIOLA CONNARIAE sp. nov.

Amphigena, maculas orbiculares vel irregulares 1-2 cm latas atras velutinas formans, saepe confluentes et magnam partem folium occupantes; mycelio ex hyphis septatis brunneis radiantibus ramosis 8-10 μ latis composito; hyphopodiis capitatis alternantibus vel irregularibus, cellula superiore oblonga 15-20 μ longa, 18-22 μ lata, cellula basali 8-10 μ longa; hyphopodiis mucronatis paucis, alternantibus vel oppositis, ampulliformibus, usque ad 25-30 μ longis; setis mycelicis numerosis, saepe prope basim peritheciis, erectis, rectis vel leviter curvatis, 600-700 μ longis, 12-15 μ latis, atris, opacis, simplicibus, acutis vel obtusis; peritheciis numerosis, globosis, atris, tuberculatis, 150-170 μ diam.; ascis oblongo-ovatis, 60-70 μ longis, 35-40 μ latis, 2-4-sporis; sporidiis oblongis, utrinque late rotundatis, 4-septatis, ad septa constrictis, obscure brunneis, 50-55 μ longis, 20-25 μ latis.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25622 Yates*, December 20, 1916. On leaves of *Connarus*.

The *Meliola* is associated with a species of *Helminthosporium*. Some of the spores are only 10 to 12 μ in diameter.

MELIOLA DIOSPYRIAE sp. nov.

Amphigena, plerumque epiphylla, maculas atras, velutinas, orbiculares vel irregulares formans; mycelio abundante, ex hyphis obscure brunneis 8 μ crassis composito; hyphis matrici adpresso; ramis oppositis vel irregularibus; hyphopodiis capitatis numerosis, oppositis, cellula superiore subglobosa, 12-15 μ lata, cellula inferiore 4-5 μ longa; hyphopodiis mucronatis paucis, ampulliformibus, usque ad 20 μ longis; setis mycelicis numerosis, erectis, rectis, vel leviter curvatis, 500-650 μ longis, 10 μ latis, atris, opacis, simplicibus, acutis; peritheciis paucis in quaque macula, globosis, atris, tuberculatis, 80-120 μ diam., ascis non visis; sporidiis cylindraceis, utrinque late rotundatis, 4-septatis, ad septa leviter constrictis, brunneis, 45-55 μ longis, 20-22 μ latis.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25711 Yates*, December 8, 1916. On leaves of *Diospyros discolor*.

MELIOLA ELAEOCARPEAE sp. nov.

Amphigena, plagulas atras, pelliculosas, orbiculares, 1-6 mm diam., saepe confluentes, mycelio ex hyphis ad basim peritheciis centrifugis ramosis oppositis brunneis septatis 6-10 μ latis composito; hyphopodiis capitatis numerosis, oppositis, cellula superiore ovoidea, 10-12 μ diam., cellula basali 5-6 μ longa; hyphopodiis mucronatis paucis, irregularibus vel oppositis, ampulliformibus, 15-18 μ longis, 6-8 μ latis; setis mycelicis erectis, rectis vel ad basim geniculatis, simplicibus, 300 μ longis, 10-12 μ latis, atris, opacis, apicem versus brunneis, acutis vel obtusis; peritheciis paucis in quaque macula, subglobosis, obscure brunneis, tuberculatis, 100-120 μ diam., ascis evanescentibus; sporidiis 4-septatis, brunneis, ad septa constrictis, utrinque late rotundatis, 55 μ longis, 22 μ latis.

LUZON, Benguet Subprovince, *Bur. Sci. 25175 Yates*, May 3, 1916. On leaves of *Elaeocarpus*.

The very numerous, opposite, capitate hyphopodia together with the comparatively short thick setae are characteristic.

MELIOLA IXORIAE sp. nov.

Amphigena, maculas atro-griseas, orbiculares vel irregulares, 5-15 mm diam., saepe confluentes; mycelio abundante, ex hyphis septatis flexuosis brunneis 5-8 μ crassis composito; ramis oppositis vel irregularibus; hyphopodiis capitatis numerosis, alternantibus vel unilateralibus, cellula superiore lobata vel rotundata 12-16 μ longa, 10-15 μ lata; inferiore 5-12 μ longa, 6 μ lata; hyphopodiis mucronatis paucis, oppositis vel irregularibus, ampulliformibus, 12-14 μ longis; setis mycelicis 600-750 μ longis, 8-10 μ latis, erectis, rectis vel leviter curvatis, saepe ad basim geniculatis, inferne opacis, atris, simplicibus, acutis; setis peritheciis circiter 8 ad basim quaque perithecium; peritheciis globosis, atris, opacis, tuberculatis, 100-125 μ diam.; ascis 2-4-sporis 55-65 μ longis, 20-26 μ latis; sporidiis oblongis, utrinque rotundatis, 4-septatis, ad septa non constrictis, saepe leviter curvatis, 40 μ longis, 14 μ latis.

LUZON, Manila and vicinity, *Bur. Sci. 25841 Yates*, February, 1917. On leaves of *Ixora philippinensis*.

MELIOLA LEUCOSYKEAE sp. nov.

Epiphylla, plagulas atras, orbiculares, 4-8 mm diam., mycelio sparso, ramis oppositis vel irregularibus, ex hyphis brunneis septatis 7-8 μ latis composito; hyphopodiis capitatis numerosis, alternantibus, cellula superiore subglobosa, 10 μ longa, 12-14 μ lata; cellula inferiore 5 μ longa; hyphopodiis mucronatis paucis, ampulliformibus, 10-15 x 4-7 μ; setis mycelicis numerosis, 300 μ longis, ad basim ad 8 μ latis, erectis, rectis vel leviter curvatis; inferne atris, opacis, apicem versus dilutiore brunneis, obtusis, peritheciis globosis, 230-260 μ diam., tuberculatis; ascis oblongis, 60-70 x 25-30 μ, 6-8-sporis; sporidiis 3-septatis, ad septa non constrictis, utrinque late rotundatis, fuscis, 35-40 μ longis, 14-16 μ latis.

SAMAR, Catubig River, *Bur. Sci. 24621 Ramos*, February 17, 1916. On leaves of *Leucosyke capitellata*.

The 3-septate spores is the most characteristic feature of this species; no other species of *Meliola* with 3-septate spores has been reported on any of the *Urticaceae*.

MELIOLA LITSEAE sp. nov.

Mycelio amphigeno, plerumque hypophyllo, maculas atras, orbiculares 2-6 mm diam., saepe confluentes, mycelio ex hyphis paucis ramosis flexuosis irregularibus brunneis septatis 6-8 μ latis composito; hyphopodiis capitatis numerosis, alternantibus vel irregularibus, cellula superiore subglobosa, 15-18 μ diam.; cellula inferiore 6-8 μ longa; hyphopodiis mucronatis paucis, irregularibus, ampulliformibus, usque ad 20 μ longis; setis peritheciis et mycelicis circiter 800 μ longis, 12 μ latis, numerosissimis, erectis, rectis vel leviter curvatis, atris, opacis, simplicibus, acutis, vel ad apicem bi-tridentatis, iterum in ramulos duos divisis et ramulis bis ad apicem breviter bi-tridentatis; peritheciis numerosis, globosis, atris, opacis, tuberculatis, 170-200 μ diam., in sicco collapsis; ascis ovatis, 2-4-sporis, 60-65 μ longis, 38-40 μ latis; sporidiis oblongo-ovatis vel cylindraceis, utrinque late rotundatis, 4-septatis, ad septa constrictis, brunneis, 50-55 μ longis, 18-28 μ latis.

SAMAR, Catubig River, *Bur. Sci. 24677 Ramos*, March 1, 1916. On leaves of *Litsea*.

This *Meliola* is distinguished by the long, forked setae, which appear to arise both from the mycelium and from the base of the perithecium.

MELIOLA LIVISTONIAE sp. nov.

Hypophylla, plagulas aterrimas, velutinas, orbiculares, 3-5 cm diam.; mycelio laxo, ex hyphis irregulariter ramosis obscure brunneis septatis 6-7 μ crassis ex peritheciis radiantibus composito; hyphopodiis capitatis paucis, alternantibus vel irregularibus, numquam oppositis, cellula superiore irregulariter lobata, circiter 15-25 μ diam., cellula inferiore saepe curvata 20-25 μ longa; hyphopodiis mucronatis paucis, ampulliformibus, usque ad 20 μ longis; setis mycelicis numerosissimis, 300-350 μ longis, 8-9 μ latis, erectis, rectis vel leviter curvatis, opacis, acutis vel 2-3-denticulatis, dentibus 5-6 μ longis; peritheciis globosis, opacis, atris, tuberculatis, 175-250 μ diam.; ascis evanescentibus; sporidiis oblongis, 4-septatis, ad septa leviter constrictis, brunneis, utrinque late rotundatis, 50-55 x 12-22 μ.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25632 Yates*, December 19, 1916. On leaves of *Livistona*.

Meliola livistoniae is distinguished by the forked setae and the irregularly lobed capitate hyphopodia. There is great variation in the shape of the spores of this species; some of the spores are cylindric and slender, 12 μ diam., others are 20-22 μ diam.

MELIOLA MACARANGAE sp. nov.

Mycelio epiphyllo, plagulas orbiculares, atras, 2-5 mm diam., ex hyphis brunneis ramosis 7 μ crassis composito; hyphopodiis capitatis numerosis, plerumque oppositis, cellula superiore subglobosa, 8-10 μ diam.; cellula inferiore 4 μ longa; hyphopodiis mucronatis numerosis, ampulliformibus, usque ad 15 μ longis; setis mycelicis erectis, rectis, 170-220 μ longis, 10 μ latis, septatis, acutis vel apicem versus dilutioribus et obtusis; peritheciis globosis, subopacis, obscure brunneis, 120-150 μ diam., ostiolatis, tuberculatis; ascis oblongo-ovatis, 50 x 20 μ, 2-4-sporis; sporidiis 4-septatis, ad septa constrictis, oblongo-cylindraceis, utrinque late rotundatis 34-36 μ longis, 10-15 μ latis, fuscis.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25621 Yates*, December 20, 1916. On leaves of *Macaranga tanarius*.

The setae are especially numerous in the vicinity of the perithecia. The ostiole is formed by a plate of thin-walled cells. This *Meliola* is associated with a species of *Helminthosporium*.

MELIOLA MAPANIAE sp. nov.

Amphigena, maculas atras, orbiculares, 1-5 mm diam., saepe confluentes; mycelio ex hyphis brunneis septatis e peritheciis radiantis 8-12 μ crassis composito; ramis oppositis; hyphopodiis capitatis numerosis, alternantibus, cellula superiore globosa vel subglobosa, 15-17 μ diam., cellula inferiore 10-14 μ longa; hyphopodiis mucronatis numerosis, plerumque alternantibus, ampulliformibus, usque ad 20-30 μ longis; setis mycelicis numerosis, erectis, rectis, atris, opacis, 500-800 μ longis, 15 μ crassis, simplicibus, acutis; ascis non visis; sporidiis oblongis, 4-septatis, ad septa constrictis, brunneis, utrinque late rotundatis, 52-56 μ longis, 22-26 μ latis.

SAMAR, Catubig River, *Bur. Sci. 24640 Ramos*, February 20, 1916. On leaves of *Mapania*.

MELIOLA SAMARENSIS sp. nov.

Plagulas atras, velutinas, confluentes et superficiem petioliorum obtecta, mycelio denso, ex hyphis obscure brunneis septatis 7-8 μ latis composito, ramis irregularibus; hyphopodiis capitatis paucis, alternantibus vel irregularibus, cellula superiore globosa, 15 μ diam., vel elongata et 10-15 x 15-20 μ; cellula inferiore, 4-5 μ longa; hyphopodiis mucronatis paucis; setis mycelicis numerosissimis, validis, 300 μ longis, 16 μ latis, erectis, leviter curvatis, opacis, atris, apice simplicibus, acutis; peritheciis numerosis, 150-250 μ diam., atris, opacis, tuberculatis, eostiolatis; ascis evanescentibus, 60-70 x 35-40 μ, 2-4-sporis; sporidiis 4-septatis, brunneis, oblongis, ad septa leviter constrictis, utrinque late rotundatis, 45-48 μ longis, 18-20 μ latis.

SAMAR, Catubig River, *Bur. Sci. 24919 Ramos*, March 12, 1916. On the petioles of an unknown host.

Meliola samarensis seems to be most closely related to *M. aliena* from which it differs by the larger perithecia and more slender spores. The very numerous, short, thick setae completely obscure the mycelium and the perithecia, covering them with a tough plush-like growth.

MELIOLA SAUROPICOLA sp. nov.

Epiphylla, rariter caulicola, maculas dispersas, atras, orbiculares, 2-4 mm diam., saepe confluentes; mycelio ex hyphis ad basim perithecii centrifugis rectis septatis ramosis 6-8 μ latis composito; hyphopodiis capitatis numerosis, alternantibus vel irregularibus, bicellularibus, cellula superiore 15-20 μ longa, 10-12 μ lata, inferiore 8-10 μ longa; hyphopodiis mucronatis numerosis, alternantibus vel irregularibus, ampulliformibus, usque ad 20 μ longis; setis mycelicis erectis, rectis vel leviter curvatis, 500-650 μ longis, 12-15 μ latis, inferne opacis, atris, apicem versus obscure brunneis, obtusis, simplicibus; peritheciis rotundatis, applanatis, 110-160 μ diam., contextu ex cellulis plus minus radiantibus 6-8 μ diam. composito, in sicco collapsis; ascis evanescentibus, circiter 2-4-sporis; sporidiis cylindraceis, utrinque rotundatis, 4-septatis, ad septa leviter constrictis, fuscis, 42-45 μ longis, 15-17 μ latis.

SAMAR, Catubig River, *Bur. Sci. 24705 Ramos*, February 15, 1916. On leaves of *Sauropus*.

The capitate hyphopodia are mostly alternate and are often 50 μ apart. The ostiole is formed by a plate of thin-walled cells.

MELIOLA TAYABENSIS sp. nov.

Hypophylla, maculas atras, orbiculares 1-2 cm diam., saepe confluentes et irregulares, dein plus minusve totum superficiem folium obtecta; mycelio ex hyphis obscure brunneis rectis septatis irregulariter ramosis 6 μ latis composito; hyphopodiis capitatis numerosis, alternantibus, cellula superiore subglobosa, circiter 10 μ lata, inferiore 6-7 μ longa; hyphopodiis mucronatis irregularibus, ampulliformibus, usque ad 17-20 μ longis, setis mycelicis numerosis, 250-300 μ longis, 8-10 μ latis, erectis, rectis vel leviter curvatis, atris, opacis, apice simplicibus, acutis vel obtusis; peritheciis paucis, globosis, glabris, atris, opacis, 150-200 μ diam., in sicco collapsis; ascis evanescentibus; sporidiis 4-septatis, fuscis, cylindraceis, utrinque late rotundatis, ad septa leviter constrictis, 40-50 μ longis, 14-16 μ latis.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25649 Yates*, December, 1916. On leaves of *Linociera.*

This species is distinguished from *Meliola linocierae* Syd. by its somewhat larger spores, shorter mucronate hyphopodia, and longer setae.

MELIOLA TERAMNIAE sp. nov.

Amphigena, maculas atras, suborbiculares, 2-4 mm diam.; mycelio ex hyphis brunneis anastomosantibus 4-5 μ crassis composito, ramis irregularibus; hyphopodiis capitatis numerosis, alternantibus vel oppositis, cellula superiore ovoidea vel subglobosa, 10-12 μ lata, inferiore 4-5 μ longa; hyphopodiis mucronatis paucis, ampulliformibus, usque ad 20 μ longis; setis mycelicis numerosissimis, erectis, rectis vel leviter curvatis, 400-850 μ longis, 10 μ latis, septatis, inferne subopacis vel obscure brunneis, superne brunneis, plus minusve dilutioribus, simplicibus, acutis vel obtusis vel 2-3-furcatis, ramis 8 ad 15 μ longis; peritheciis paucis in quaque macula, globosis, tuberculatis, obscure brunneis, 90-120 μ diam.; ascis ovatis, 45-50 x 25 μ, 2-4-sporis; sporidiis elongatis, utrinque late rotundatis, 4-septatis, ad septa constrictis, fuscis, 40-44 μ longis, 15-17 μ latis.

LUZON, Kalinga Subprovince, *Bur. Sci. 25344 Yates*, March 27, 1916. On leaves of *Teramnus labialis.*

This *Meliola* appears to be quite close to *M. bicornis* Winter, differing from it mainly in mycelial characters. In the latter species the capitate hyphopodia are said to be opposite; in ours the perithecia and asci are somewhat smaller and the spores slightly larger than in *M. bicornis.* Comparison with material of *M. bicornis* might show this to be a variety of it rather than a distinct species.

PARODIELLA Spegazzini

PARODIELLA PERISPORIOIDES Speg. in Anal. Soc. Cient. Arg. 9 (1880) 178.

LUZON, Manila and vicinity, *Merrill 8393*, September-October, 1912. On leaves of *Desmodium triflorum.*

MICROTHYRIACEAE

ASTERINA Léveillé

ASTERINA CAPPARIDIS Syd. et Butl. in Ann. Myc. 9 (1911) 390.

LUZON, Manila and vicinity, *Bur. Sci. 25384 Yates*, August, 1916. On leaves of *Capparis micracantha.*

ASTERINA COLLICULOSA Speg. in Fung. Puigg. No. 347.

LUZON, Rizal Province, *Bur. Sci. 21902 Ramos*, August, 1913. On leaves of *Eugenia jambolana.*

ASTERINA ELMERI Syd. in Leafl. Philip. Bot. 4 (1911) 1156.

LUZON, Cavite Province, *Bur. Sci. 22610 Ramos & Deroy*, April-May, 1915. On the leaves of *Champereia manillana.*

ASTERINA SPONIAE Rac. Paras. Alg. Pilze Jav. 3 (1900) 34.

LUZON, Bulacan Province, Angat, *Bur. Sci. 21845 Ramos*, September, 1913. ALABAT, back of Sangirin, *Merrill 10522*, December 21–30, 1916. On leaves of *Trema orientalis.*

ASTERINA ASTRONIAE sp. nov.

Epiphylla, plagulis suborbicularibus vel irregularibus, 4-8 mm diam., saepe confluentibus, atris, mycelio ex hyphis paucis brunneis septatis anastomosantibus irregulariter ramosis 3-4 μ latis composito; hyphopodiis unicellularibus, paucis, irregulariter distributis, ovoideis, elongatis integris vel lobatis, 5-6 μ longis, 4-6 μ latis, peritheciis numerosis in quaque macula, suborbicularibus, applanatis, 160-200 μ diam., irregulariter dehiscentibus, contextu radiatim, ex hypis obscure brunneis 2-4 μ diam. composito, ambitu vix fimbriatus; ascis subglobosis vel ovoideis, 45-55 x 28-35 μ, octosporis, paraphysatis; sporidiis conglobatis, oblongis, utrinque rotundatis, ad medio 1-septatis, constrictis, fuscis, 18-28 μ longis, 10-12 μ latis.

SAMAR, Catubig River, *Bur. Sci. 24695 Ramos*, March 21, 1916. On leaves of *Astronia* sp.

ASTERINA BREYNIAE sp. nov.

Epiphylla, maculas orbiculares vel irregulares, atras 1-3 mm diam., vel confluentes et plus minus totam folii superficiem obtecta; mycelio ex hyphis ramosis anastomosantibus obscure brunneis septatis 4-5 μ crassis composito; hyphopodiis paucis, alternantibus vel irregularibus, rotundatis, lobatis, vel angulatis, 10-15 μ longis, 7-8 μ latis; peritheciis numerosis, rotundatis,

obscure brunneis, subopacis, 40-50 μ diam., irregulariter dehiscentibus, contextu ex hyphis radiatis 3-4 μ latis composito, mox pseudo-parenchymatibus; ascis ovatis, 25-30 μ longis, 15 μ latis, octosporis, aparaphysatis; sporidiis elongatis, utrinque rotundatis, constrictis, fuscis, laevis, 12-15 μ longis, 4-5 μ latis, loculo superiore majore.

LUZON, Bontoc Subprovince, *Bur. Sci. 25257 Yates,* April 14, 1916. On leaves of *Breynia acuminata.*

The peculiar angular or lobed hyphopodia are characteristic of this species.

ASTERINA CIPADESSAE sp. nov.

Epiphylla, maculas atras, primo orbiculares, 2-4 mm diam., mox confluentes et plus minusve totam superficiem folia obtecta; mycelio ex hyphis brunneis ramosis anastomosantibus 3-4 μ crassis composito; hyphopodiis numerosis, plerumque oppositis vel etiam alternantibus, irregulariter 2-4-lobatis, 7-10 μ longis; peritheciis numerosis, 150-250 diam., obscure brunneis, subopacis vel opacis, rotundatis vel ellipsoideis, irregulariter dehiscentibus, contextu ex hyphis septatis radiatis 5-7 μ latis composito, margine vix fimbriatis; ascis ovatis, 35-45 μ longis, 22-27 μ latis, octosporis, paraphysatis; sporidiis oblongis, utrinque rotundatis, ad medio 1-septatis, constrictis, obscure brunneis, papillatis, 28-32 μ longis, 10-12 μ latis

LUZON, Kalinga Subprovince, *Bur. Sci. 25307 Yates,* March 30, 1916. On leaves of *Cipadessa.*

ASTERINA EUGENIAE sp. nov.

Hypophylla, maculas saepe marginales, usque 10 mm diam., orbiculares vel irregulares; mycelio ex hyphis paucis effusis laxis septatis obscure brunneis ramosis anastomosantibus 4-6 μ crassis composito; hyphopodiis paucis, alternantibus vel irregularibus, cylindraceis, rotundatis, 10-12 μ longis, 6 μ latis; peritheciis numerosis, applanatis, atris, opacis, 225-275 μ diam., centro perforatis, contextu ex hyphis radiantibus 3-5 μ latis composito; ascis oblongo-ovatis, paraphysatis, octosporis, 50-60 μ longis, 20-22 μ latis; sporidiis oblongis, utrinque rotundatis, 1-septatis, ad septa constrictis, hyalinis, 20 μ longis, 5 μ latis (immaturis), loculo superiore majore.

LUZON, Batangas Province, *Bur. Sci. 22678 Ramos & Deroy,* April 29, 1915. On leaves of *Eugenia.*

ASTERINA NYCTICALIAE sp. nov.

Maculis plerumque epiphyllis, orbicularibus vel irregularibus, atris, 3-5 mm diam., mycelio ex hyphis paucis septatis obscure brunneis composito, ramis plerumque oppositis, anastomosantibus, 5-6 μ latis; hyphopodiis numerosis, plerumque alternantibus vel irregularibus, dichotomo-lobatis, 10-11 μ longis, 12-15 μ latis, 1-cellularibus; peritheciis numerosis, rotundatis, applanatis, minutis, 90-110 μ diam., obscure brunneis, sub-opacis, stellatim dehiscentibus; contextu radiatim, hyphis septatis 4-5 μ latis; ascis ovatis vel subglobosis, 26-28 x 18-20 μ, octosporis, paraphysatis; sporidiis oblongis, utrinque rotundatis, ad medio 1-septatis, constrictis, brunneis, laevis, 15-18 μ longis, 7-8 μ latis.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25669 Yates*, Dec., 1916. On leaves of *Nycticalos cuspidatum*.

ASTERINA TAYABENSIS sp. nov.

Plagulis epiphyllis, atris, primo orbicularibus 3-4 mm diam., mox confluentibus, et magnam partem folii obtecta; mycelio abundante, ex hyphis brunneis septatis anastomosantibus ramosis irregularibus 4-6 μ latis composito; hyphopodiis paucis, dispersis, irregulariter distributis, breviter cylindraceis, rotundatis, 10-12 μ longis, 5-7 μ latis; peritheciis numerosis, globosis, 130-200 μ diam., tenuis, stellatim dehiscentibus, radiatim contextis ex hyphis 2-6 μ crassis; ascis subglobosis, octosporis, 25 x 30 μ; paraphysatis; sporidiis oblongis, utrinque rotundatis, ad medio 1-septatis, constrictis, echinatis, 22 μ longis, 10 μ latis.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25635 Yates*, December 19, 1916. On the leaves of an unknown host.

ASTERINELLA Theissen

ASTERINELLA HYDNOCARPIAE sp. nov.

Epiphylla, maculas irregulares, 5-8 mm diam., vel confluentes et superficiem foliorum plus minusve obtecta; mycelio laxo ex hyphis radiantis 8 μ crassis brunneis composito, ramis irregularibus; hyphopodiis nullis; peritheciis numerosis in quaque macula, rotundatis et 300-400 μ diam., obscure brunneis, subopacis, contextu radiato, ex hyphis rectis brunneis 5 μ diam. composito, ambitu fimbriatis, poro centrali dehiscentibus; ascis globosis, 70 μ diam., octosporis, paraphysatis, sporidiis oblongo-ovoideis, ad medio 1-septatis, constrictis, fuscis, loculo supero parum latiore, 40-50 μ longis, 25-28 μ latis.

SAMAR, Catubig River, *Bur. Sci. 24683 Ramos*, Feb.-Mar., 1916. On leaves of *Hydnocarpus falcatus*.

MORENOELLA Spegazzini

MORENOELLA MEMECYLI Syd. in Philip. Journ. Sci. 9 (1914) Bot. 183.

LUZON, Rizal Province, *Bur. Sci. 22701 Ramos*, June, 1915. On leaves of *Memecylon lanceolatum*.

MORENOELLA BEILSCHMIEDIAE sp. nov.

Hyphophylla, plagulas totum folium plus minusve occupans; mycelio parcissime evoluto, ex hyphis radiantibus ramosis anastomosantibus brunneis 3-5 μ crassis composito; peritheciis numerosis, primitus orbicularibus, tandem elongatis, 400-600 μ longis, 100-150 μ latis, rima latiuscula dehiscentibus, contextu ex hyphis radiantibus obscure brunneis 3-5 μ latis composito; ascis ovatis, 36-45 μ longis, 25-30 μ latis, octosporis; sporidiis oblongis, utrinque rotundatis, ad medio 1-septatis, vix constrictis, laevis, hyalino-fuscis, 25-30 μ longis, 6-7 μ latis, cellula superiore parum latiore quam inferiore.

SAMAR, Catubig River, *Bur. Sci. 24687 Ramos*, February 27, 1916. On the leaves of *Beilschmiedia nervosa.*

CAPNODIACEAE

AITHALODERMA Sydow

AITHALODERMA CLAVATISPORUM Syd. in Ann. Myc. 11 (1913) 388.

LUZON, Bulacan Province, Angat, *Bur. Sci. 21798 Ramos*, September, 1913. On leaves of *Antidesma bunius.*

HYPOCREACEAE

NECTRIA Fries

NECTRIA STRIATULA sp. nov.

Stromatibus corticalis, sanguineis, suborbicularibus, erumpentibus, 0.5-1 mm diam., contextu aurantiaceis, parenchymaticis; peritheciis 3-12 in quaque stromata, subglobosis, 150-300 μ diam., ostiolis papillatis; ascis cylindraceis, 100 x 8 μ, octosporis, evanescentibus, aparaphysatis; sporis monostichis, ellipsoideis, utrinque obtusis, ad medio 1-septatis, non constrictis, olivaceis, membrana longitudinaliter striolata.

ALABAT, back of Sangirin, *Merrill 10519*, December 21–30, 1916. On a dead tree in forest.

The finely striated spores are characteristic of this species of *Nectria.*

POLYSTOMELLACEAE

INOCYCLUS Theissen et Sydow

INOCYCLUS PSYCHOTRIAE Syd. in Ann. Myc. 8 (1915) 211.

Hysterostomella psychotriae Syd. in Philip. Journ. Sci. 8 (1913) Bot. 275.

LUZON, Bulacan Province, Angat, *Bur. Sci. 21804 Ramos*, September, 1913. On leaves of *Psychotria luzoniensis.*

ACTINODOTHIS Sydow

ACTINODOTHIS PIPERIS Syd. in Philip. Journ. Sci. 9 (1914) Bot. 175.

LUZON, Bulacan Province, Angat, *Bur. Sci. 21843 Ramos*, September, 1913, on leaves of *Piper retrofractum:* Rizal Province, *Bur. Sci. 21928 Ramos*, August, 1913, on leaves of *Piper* sp.: Manila and vicinity, *Bur. Sci. 25380 Yates*, August, 1916, on leaves of *Piper* sp.

A very common fungus on *Piper* in the Philippines; in some localities almost all plants are affected. It does not appear to cause any particular harm to the plants.

PHYLLACHORACEAE

TRABUTIA Saccardo et Roumeguere

TRABUTIA BENGUETENSIS sp. nov.

Stromatibus hypophyllis, irregulariter dispersis, 1 mm diam., vel congregatis, 3-6 mm diam., rotundatis, atris; loculis applanatis, 450-500 μ diam., 60-70 μ altis; stroma opaca 30-35 μ crassa, interiore obscure brunneis, ex hyphis 3-4 μ crassis formato; ascis oblongo-ovatis 40 x 15 μ, octosporis, paraphysatis; sporidiis distichis, subglobosis, 1-cellularibus, hyalinis, 6 μ longis, 5 μ latis.

LUZON, Benguet Subprovince, *Bur. Sci. 25173 Yates*, May 3, 1916. On the leaves of *Ficus benguetensis*.

Trabutia benguetensis is distinguished from other species of *Trabutia* occurring on *Ficus* by its small spores.

CATACAUMA Theissen et Sydow

CATACAUMA ASPIDIUM (Berk.) Theiss. et Syd. in Ann. Myc. 13 (1915) 380.

Phyllachora ficium Niessl. var. *spinifera* Karst. et Har. in Rev. Myc. 12 (1890) 172.

SAMAR, Catubig River, *Bur. Sci. 24676 Ramos*, February-March, 1916. On leaves of *Ficus* sp.

CATACAUMA ASPIDIUM (Berk.) Theiss. et Sydow, forma **FICI-FULVAE** Theiss. et Syd. in Ann. Myc. 13 (1915) 381.

Phyllachora fici-fulvae Koord. in Verh. K. Akad. Wet. Amsterdam 2 (1907) 182.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25710 Yates*, December, 1916. On leaves of *Ficus* sp.

CATACAUMA LAGUNENSE Syd. in Ann. Myc. 13 (1915) 378.

Phyllachora lagunensis Syd. in Philip. Journ. Sci. 8 (1913) 278.

LUZON, Bontoc Subprovince, *Bur. Sci. 25262 Yates*, April-May, 1916. On leaves of *Ficus* sp.

CATACAUMA ELMERI Syd. in Ann. Myc. 13 (1915) 378.

Phyllachora elmeri Syd. in Leafl. Philip. Bot. 4 (1911), 1157.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25698 Yates*, December, 1916. On leaves of *Ficus* sp.

The spores of this specimen are somewhat immature. They are mostly 7–8 x 4–5 μ, while in the type they are 10–12 x 5.5–7 μ.

PHYLLACHORA Nitschke

PHYLLACHORA CANARI P. Henn. in Hedw. 47 (1908) 254.

LUZON, Rizal Province, *Bur. Sci. 21924 Ramos*, August, 1913: Bulacan Province, Angat, *Bur. Sci. 21791 Ramos*, September, 1913. On leaves of *Canarium villosum*.

PHYLLACHORA COICIS P. Henn. in Hedw. 34 (1895) 12.

LUZON, Ifugao Subprovince, *Bur. Sci. 25280 Yates*, April, 1916. On leaves of *Coix lachryma-jobi*.

PHYLLACHORA DALBERGIAE Niessl. in Hedw. 20 (1881) 99.

ALABAT, back of Sangirin, *Merrill 10554*, December 21–30, 1916. On leaves of *Dalbergia* sp.

PHYLLACHORA LUZONENSIS P. Henn. in Hedw. 47 (1908) 255.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25667, 25700 Yates*, December, 1916. On leaves of *Millettia* sp.

PHYLLACHORA PONGAMIAE P. Henn. in Hedw. 47 (1908) 255; Petch in Ann. Roy. Bot. Gard. Peradeniya 5 (1912) 291.

Rhytisma pongamiae Berk. et Br. Fungi of Ceylon No. 1128.

Cryptomyces pongamiae Sacc. in Syll. Fung. 8 (1889) 708.

ALABAT, back of Sangirin, *Merrill 10518*, December 21–30, 1916. On leaves of *Pongamia pinnata* (*P. glabra*).

PHYLLACHORA YAPENSIS (P. Henn.) Syd. in Philip. Journ. Sci. 8 (1913) Bot. 278.

Dothidella yapensis P. Henn. in Hedw. 41 (1902) 64.

Auerswaldia derridis P. Henn. in Hedw. 47 (1908) 255.

Phyllachora lagunae Rehm in Philip. Journ. Sci. 8 (1913) Bot. 396.

LUZON, Camarines Province, Mount Isarog, *Bur. Sci. 22123* Ramos, November-December, 1913: Ifugao Subprovince, *Bur. Sci. 25300 Yates*, April, 1916. On leaves of *Derris elliptica*.

SPHAERODOTHIS Shear

SPHAERODOTHIS ARENGAE (Racib.) Shear in Mycologia 1 (1909) 162.

Auerswaldia arengae Rac. in Parasit. Algen Pilze Jav. 3 (1900) 27.

Auerswaldia copelandi Syd. in Ann. Myc. 4 (1906) 343.

LUZON, Camarines Province, Mount Isarog, *Bur. Sci. 22127 Ramos*, November-December, 1916. On leaves of *Caryota cumingii*.

SPHAERIACEAE

MELANOPSAMMA Niessl.

MELANOPSAMMA MERRILLII sp. nov.

Peritheciis paucis, superficialibus, globosis, atris, carbonaceis, 200-500 μ diam., ostiolis papillatis; ascis cylindraceis, 120-130 μ longis, 8-10 latis, 4-sporis, paraphysatis, paraphysis filiformibus; sporidiis monostichis, ellipticis, ad medio 1-septatis et levissime constrictis, utrinque obtusis, hyalinis, 22-24 μ longis, 6-8 μ latis.

ALABAT, back of Sangirin, *Merrill 10554*, December 25, 1916. On trees in the virgin forest.

MYCOSPHAERELLACEAE

GUIGNARDIA Viala et Ravaz

GUIGNARDIA CREBERRIMA Syd. in Philip. Journ. Sci. 8 (1913) Bot. 482.

LUZON, Bulacan Province, Angat, *Bur. Sci. 21788 Ramos*, September, 1913, on living *Capparis horrida;* it is very common and abundant on this host.

GUIGNARDIA ARISTOLOCHIAE Syd. in Ann. Myc. 12 (1914) 555.

LUZON, Laguna Province, Calamba, *Merrill 9116:* Rizal Province, *Bur. Sci. 21959 Ramos*, August, 1913. On the living leaves of *Aristolochia tagala.*

MYCOSPHAERELLA Johanson

MYCOSPHAERELLA MERRILLII sp. nov.

Maculis definitis, orbicularibus, 1-2 cm diam., centro pallescente, margine luteus; peritheciis numerosis in quaque macula, atris, globosis, minutis, 70-100 μ diam., immersis, ostiolis epiphyllis, 5-8 μ latis, pertusis; contextu subopaco, fusco, ex cellulis 4-6 μ diam. composito; ascis cylindraceis, octosporis, 45-55 x 7-10 μ, aparaphysatis; sporidiis plerumque distichis, oblongis, utrinque rotundatis, ad medio 1-septatis, non constrictis, brunneis, 8-11 μ longis, 2.5-3.5 μ latis.

ALABAT, back of Sangirin, *Merrill 10542*, December 26, 1916. On the leaves of *Erythropalum.*

STIGMATEA Fries

STIGMATEA PHILIPPINENSIS sp. nov.

Maculis albo-griseis, orbicularibus vel elongatis, 5 mm diam. vel usque ad 3 cm longis et 1 cm latis; peritheciis immersis. ostiolis numerosis, epiphyllis, hemisphaericeis, 75-100 μ diam.; ostiolis orbicularibus; ascis elongatis, 26-30 μ longis, 10 μ latis, octosporis; sporidiis oblongo-ellipsoideis, ad medio 1-septatis, laevis, 12-13 μ longis, 3-4 μ latis.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25662 Yates*, December 19, 1916. On leaves of *Homalium* sp.

PLEOSPORACEAE

MERRILLIOPELTIS P. Hennings

MERRILLIOPELTIS CALAMI P. Henn. in Hedw. 47 (1908) 262.

ALABAT, back of Sangirin, *Merrill 10530*, December 21–30, 1916. On dead stems of *Calamus*.

MERRILLIOPELTIS TAYABENSIS sp. nov.

Peritheciis solitariis vel plus minusve dense maculiformiter dispositis, subcortice positis dein epidermide elevata et pertusa; pseudostromata atra, effusa, saepe conjuncta, sublenticularis, 350-500 μ lata, 100-150 μ alta; ostiolo minutissimo, vix perspicuo, contextu opaco; ascis elongato-clavatis, apice valde incrassatis, stipitatis, 210-230 μ longis, 12-14 μ latis in perithecio fere horizontaliter dispositis; paraphysibus paucis; sporidiis plerumque distichis, fusiformibus, ad medio 1-septatis, non constrictis, hyalinis, utrinque longe et acutissime attenuatis, 90-100 μ longis 5-7 μ latis.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25607 Yates*, December 19, 1916. On dead stems of *Calamus*.

This species is very near *Merrilliopeltis hoehnelii* Rehm, differing from it in the size of spores and asci and in the superficial appearance of the perithecia which are covered by the cortical layer of the host and are exposed only through cracks in the latter. It agrees with Rehm's species in the peculiar arrangement of the asci.

PLEOSPORA Rabenhorst

PLEOSPORA MISCANTHIAE sp. nov.

Culmicola, superficium culmis obtecta, velutinas, atras; mycelio ex hyphis obscure brunneis 6-10 μ crassis composito; peritheciis paucis, atris, laevis, 100-200 μ diam.; ascis clavatis, 140 μ longis, 26-32 μ crassis, octosporis, paraphysatis; paraphysis filiformibus, hyalinis; sporidiis muriformibus, oblongo-fusoideis, hyalinis, 16-20-septatis, 60-75 μ longis, 10-12 μ latis; conidiophoris erectis, 350-400 μ altis, 6-8 μ latis; conidiis brunneis, 9-11-septatis, 75-90 x 10-12 μ.

LUZON, Bontoc Subprovince, *Bur. Sci. 25231 Yates*, April 19, 1916. On the culms of *Miscanthus japonicus*.

This fungus presents a very characteristic appearance. The dead culms are covered by a dense velvety coating formed by the erect conidiophores. The perithecia are buried among and completely hidden by the conidiophores.

VALSACEAE

EUTYPA Tulasne

EUTYPA BAMBUSINA Penz. et Sacc. in Icones Fung. Java. (1904) 32.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25625 Yates*, December, 1916. On dead culms of bamboo. Also *Bur. Sci. 25599, 25640 Yates*, from the same locality.

This is one of the commonest of our Philippine fungi occurring everywhere upon dead culms of bamboo.

DIATRYPACEAE

DIATRYPE Fries

DIATRYPE CHLOROSARCA B. et Br.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25643 Yates*, December, 1916. On dead sticks lying on the ground in the forest.

XYLARIACEAE

HYPOXYLON Bulliard

HYPOXYLON EFFUSUM Nitsch. in Pyren. Germ. (1867–1870) 48.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25653 Yates*, December, 1916. On bark of dead trees in the forest.

HYPOXYLON MARGINATUM (Schw.) Berk. Cuban Fungi No. 830.

Sphaeria marginata Schw. in Syn. Am. Bor. No. 1176.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25653, 25623 Yates*, December, 1916. On bark of dead trees in the forest.

HYPOXYLON CADIGENSIS sp. nov.

Stromatibus superficialibus, hemisphaericeis, atris, gregariis, 7-10 mm diam.; peridium atrum, 150-180 μ crassum, intus albidus; peritheciis numerosis, globosis, circiter 1 mm crassis; ascis cylindraceis, 150-160 μ longis, 12-15 μ latis, pedicellatis, aparaphysatis; sporidiis monostichis, ellipsoideis, inaequilateralibus, utrinque acutis, fuligineis, 20-23 μ longis, 8-10 μ latis.

LUZON, Tayabas Province, Mount. Cadig, *Bur. Sci. 25807 Yates*, December, 1916. On dead logs in the forest.

NUMMULARIA Tulasne

NUMMULARIA ALABATENSIS sp. nov.

Stromatibus primo subcutaneis, mox erumpentibus, applanatis, carbonaceis, intus et extus nigris, oblongis vel irregularibus, 1-2.5 x 3-10 cm; peritheciis monostichis, subglobosis, 200-300 μ diam.; ascis cylindraceis, evanescentibus, 75-85 μ longis, 7 μ latis, octosporis; sporidiis monostichis, ellipsoideis, utrinque rotundatis, non septatis, fuligineis, 10-11 μ longis, 5 μ latis.

ALABAT, back of Sangirin, *Merrill 10515*, December 25, 1915. On dead trunks in the forest.

NUMMULARIA REYESIANA Rehm in Leaf. Philip. Bot. 8 (1916) 2960.

LUZON, Tayabas Province, Mount Cadig, *Bur. Sci. 25760 Yates*, December, 1916. On dead stems of bamboo.

KRETZMARIA Fries

KRETZMARIA GHOMPHOIDEA Penz. et Sacc. in Icones Fung. Jav. (1904) 27.

LUZON, Tayabas Province, Basiad, *Bur. Sci., 25678 Yates* December, 1916; Mount Cadig, *Bur. Sci. 25794 Yates*, December, 1916. On rotten wood in forests.

The spores in the above specimen are 7-8 x 4-5 μ, being slightly smaller than those of the type from Java which is described as having spores 8-10 x 5-6 μ. This species has not been previously reported from the Philippines.

XYLARIA Hill

XYLARIA CONIFORMIS Fr. in Summ. Veg. Scand. (1846–1849) 381.

ALABAT, back of Sangirin, *Merrill 10549*, December 21-30, 1916. On rotten logs.

XYLARIA LUZONENSIS Henn. in Hedw. 32 (1893) 225.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25594 Yates*, December, 1916. On dead pods of *Bauhinia* lying on the ground in dense forests.

This species of *Xylaria* seems to occur only on the pods of *Bauhinia*. It has been collected several times, but always occurs on the same substratum.

XYLARIA SETOCEPHALA sp. nov.

Stipitata, gregaria, minuta, stipitis 12-14 mm longis, 0.25-0.5 mm diam.; peritheciis paucis, ad 30-40, capitulis atris, subglobosis vel ellipsoideis, 1-5 mm longis et 1-2.5 mm latis; ostiolis punctato-asperulis, seta apicalis 5-8 mm longis; ascis cylindraceis, apice rotundatis, stipitatis, paraphysatis, 89-100 x 7-8 μ, octosporis; sporidiis monostichis, ellipsoideis, 13-15 x 6-8 μ, fuligineis.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25647 Yates*, December, 19, 1916. On fallen leaves of *Garcinia* sp.

This species is distinguished by the long terminal seta. In general habit it resembles *Xylaria oocephala* Penz. et Sacc. as figured in Icon. Fung. Jav. (1904) *t. 22, f. l.*

SPHAERIOIDACEAE

PIROSTOMA Fries

PIROSTOMA ARENGAE sp. nov.

Pycnideis numerosis, superficialibus, punctiformibus, atris, 0.25-0.5 mm diam., ostiolis minutis, 20-30 μ diam.; 1-locularibus; basidiis non visis; sporidiis brunneis, ellipsoideis 9-11 μ longis, 5-7 μ latis.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25612 Yates*, December 20, 1916. On the dead petioles of *Arenga* sp.

PHYLLOSTICTA Persoon

PHYLLOSTICTA ALLOPHYLAE sp. nov.

Maculis amphigeneis pallescentis, orbicularibus vel suborbicularibus, 2-4 cm diam.; pycnidiis gregariis, epiphyllis, erumpentibus, punctiformibus, atris, lenticularibus, 100-150 μ diam., pertusis; ostiolis orbicularibus, 5-7 μ diam.; contextu brunneo; sporidiis subglobosis, laevis, 3 μ longis, 2 μ latis.

ALABAT, back of Sangirin, *Merrill 10535*, December 25, 1916. On the leaves of *Allophylus timorensis*.

This *Phyllosticta* grows on the living leaves, apparently starting near the margin or tip and advancing inward and killing the leaf in more or less concentric circles. The dead leaf surface is dotted with the small black pycnidia.

MELANCONIACEAE

MELANCONIUM Link

MELANCONIUM CALAMI sp. nov.

Acevulis orbicularibus, atris, primo subcutaneis, mox erumpentibus, 0.5-1.0 mm diam.; conidiis obscure brunneis, ovatis, subglobosis vel angulatis, 8-10 μ longis, 5-7 μ latis; basidiis non visis.

LUZON, Tayabas Province, Basiad, *Bur. Sci. 25696 Yates*, December 19, 1916. On dead leaf rachis of *Calamus*.

. DEMATIACEAE

CERCOSPORA Fresenius

CERCOSPORA GLIRICIDIAE Syd. in Philip. Journ. Sci. 8 (1913) Bot. 283.

LUZON, Manila and vicinity, *Bur. Sci. 25383 Yates*, August, 1916. On the leaves of *Gliricidia sepium*.

CERCOSPORA PERSONATA (Berk et Curt.) Ellis in Journ. Myc. 1 (1885) 63.

Cladosporium personatum Berk et Curt. in Grev. 3 (1875) 106.

LUZON, Manila and vicinity, *Merrill 7417*, November-December, 1910. On leaves of *Arachis hypogaea*.

HADRONEMA Sydow

HADRONEMA ORBICULARE Sydow in Ann. Myc. 7 (1909) 172.

LUZON, Benguet Subprovince, *Bur. Sci. 25166 Yates*, March-May, 1916: Ifugao Subprovince, *Bur. Sci. 25267 Yates*, April, 1916. On living leaves of *Quercus* sp.

This species was originally described from Japanese material where it grows on the leaves of *Quercus*. In 1910 Sydow referred *Bur. Sci. 8711 McGregor* to this species. This specimen was collected on *Quercus* at Pauai, Benguet. I found it to be quite common on the leaves of *Quercus* at higher elevations in the Mountain Province in northern Luzon. It is interesting as one of the few species known to occur only in Japan and the Philippines.

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[New generic and specific names and new combinations are indicated by **black-faced type**; synonyms and names of species incidentally mentioned in the text are in *italics*.]

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